Transfusion

Hillbrow Biobank

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For my father

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Preface

The statistics

"It is time to support an international war on disease."

- Dr Barry Bloom, Harvard University School of Public Health.
(http://news.bbc.co.uk/2/hi/health/2991725.stm)

The end of the 20th Century marks a period in which the majority of global deaths were not due to war or famine but rather the spread of diseases that have been responsible for a total of 1.3 billion deaths worldwide (McCandless 2009: 120).

The 21st Century also marks the beginning of new and ongoing public health crises, such as the 2003 global SARS outbreak and the rampant spread of HIV. These are increasingly becoming threats to the urban environments of the world that represent places where a majority of the world's population already live or are migrating to.

While certain diseases have been controlled or completely eliminated, thanks to advanced medical technologies and research, it is the growing threat of incurable, blood-born diseases such as HIV and noncommunicable diseases (NCDs) that needs to be dealt with. NCDs such as cancer, heart disease and diabetes affect millions of people everyday and according to the World Health Organisation (WHO) they are the leading cause of mortality in the world (http://www.who.int/research/en/index.html). Statistics suggest that 36 million of the 57 million global deaths in 2008 were due to NCDs. The number of people and communities afflicted is increasing.

This is quite evident within sub-Saharan Africa where more than 3000 children die from malaria each day and diabetes and TB kill more than twice the number of people as HIV/AIDS does (*Discovery Magazine* 2011:10). Medical research has been able to provide *temporary* treatment for such diseases but the quest to discover *permanent* cures is still on.

The current biotechnical age presents unique opportunities in the form of new research technologies and facilities, such as biobanks, which both scientists and doctors believe will lead to the accelerated discovery of new forms of medical treatments and cures. Biobanks illustrate a growing trend in genetic-based research which seeks to gain invaluable insight of both an individual's and a sample population's lifestyle and heredity. These new facilities also present a challenge, as they depend on a delicate yet crucial fusion between the public and the research facility, where traditional boundaries and barriers (in physical, social and psychological forms) need to be broken down and rethought, in a collaborative effort to prevent the emergence of new disease and to discover new cures.

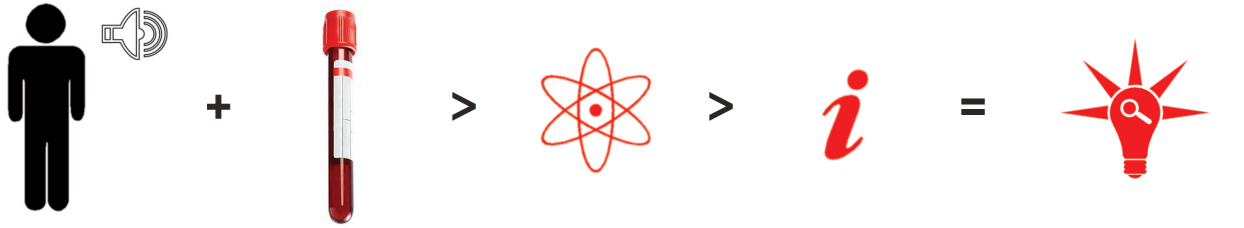
Contents

Understanding the Biobank

What is a biobank and how does it work?

> **The Biobank Process**

A series of steps is taken: from understanding the makeup of an individual through various deposits, to advanced scientific research and finally productive developments and applications from new discoveries.



> Individual analysis:
>
> > Oral deposits of lifestyle and family history
> > Physical checks
> > Mental checks

> Blood sample deposit

> DNA & genetics analysis

> New info & discoveries

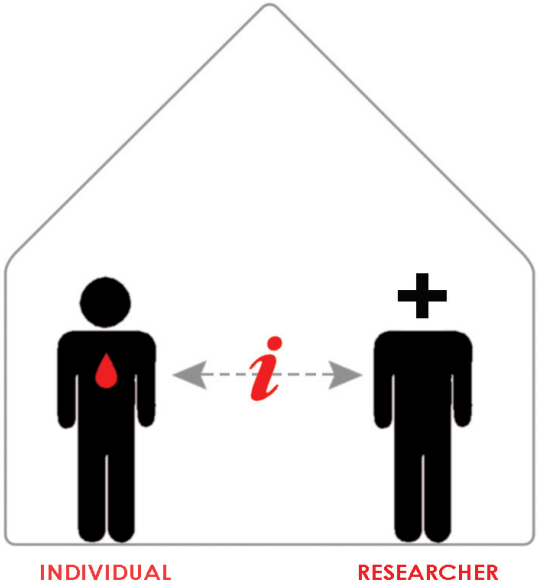
> New disease cures & forms of treatment

A biobank is a new, cutting-edge research facility that is a long-term repository for human biological samples. Samples are primarily in the form of small blood deposits, that are linked with medical data, lifestyle and family history from individuals. These samples are then comparatively used for sustained research on the biological and lifestyle determinates of disease, which both doctors and scientists believe will accelerate the discovery of diagnostics, new vaccines and forms of treatment for both the individual and general population.

With the innovative use of educational platforms and high end technologies, biobank implementation and their discoveries should be easily accommodated in developing countries (Sgaier 2007: 1074). These discoveries can eventually unravel the variants of complex diseases (such as AIDS, tuberculosis, diabetes and cancer) that are prevalent in these countries and the cause of many deaths. However, genetic research of this nature requires large, comparative studies that involves hundreds, if not thousands, of blood samples and cases. Biobank facilities therefore need to educate surrounding populations in order to receive voluntary participation and acquire the mixed sample base (both healthy and diseased samples) that is needed.

Developing countries such as Gambia, India and Mexico have already established government-funded biobanks, opening a way forward for other developing countries like South Africa to follow.

Natural occurrence and even resistance to certain diseases such as HIV-1 seem to be appearing in select populations in eastern and southern Africa (ibid). Focused biological and lifestyle research with high end genetic systems can enable an understanding of this immunity to certain diseases and can therefore be used to produce new drugs and vaccines (ibid), which are crucial for combating diseases in South Africa.



Abstract

Constant threats and crises incite growth and change in all forms and systems, including spatial environments in our contemporary city. With existing, evolving and new diseases that pose threats to urban populations, contemporary medical research technologies, whether physical or virtual in form, have undergone corresponding transformations that are now being implemented into the existing urban fabric.

As these new, high end technology infrastructures become increasingly relied upon by experts, it depicts a change in habits and beliefs that inevitably demands an adjustment in local perceptions, action and forms of engagement between the city's inhabitants and these new infrastructures. A biobank is one such infrastructure that primarily uses a blood depository for cutting edge research and is also crucially dependant on an engagement with its local community and context. However, speculations behind new research forms and embedded stigmas of blood are prevalent in local communities such as those in the inner city area of Hillbrow, Johannesburg. Inevitably, a tension will occur between the local community and biobank, which will be manifested in boundaries of all forms. Architecture is a powerful tool that can both address these boundaries and can aid in implementing the biobank through new typologies and spatial systems that include appropriate public and private interfaces. This thesis proposes a redefinition and exploration of a new medical research typology, specifically with new educational spatial environments and systems, that enhances the community's experience and engineers their awareness to the emerging dependence of genetic-based research and treatment. This should ultimately catalyse a critical transfusion among the city, its inhabitants and their biobank, ensuring that all three are sustained.

Theoretical Context

Introduction

"Crises and stress incite growth and change in all life forms. The kind of change that occurs may support or detract from the health and well-being of the system depending upon its level of resilience and intelligence." (Ellin 2006)

Johannesburg's urban landscape is a complex system that is continuously challenged by contemporary issues that require it to instantly adapt and transform in order to ensure its continued existence. Like other numerous contemporary cities, it is an urban metropolis faced with many unprecedented social, economical and cultural challenges, including an ongoing public health crisis that poses a threat to its urban population. This involves the spread of numerous diseases and a deficient public health education system that desperately requires an adaptation which corresponds with advanced, contemporary medical technologies and resources. While the spread of disease within the city is not a new problem, it is the increasing speed of the spread and emerging modalities that is a new phenomenon which needs to be addressed.

The present crisis also necessitates a questioning of social habits and beliefs. This demands an adjustment in local perception, modes of action and a general form of engagement between the city's inhabitants and new structures and devices used for disease tracking, alerting and curing, that may exist as both virtual and physical infrastructures (Sample 2008:69). The current biotechnical age[1] presents one such physical structure in the form of a biobank.

While scientists and doctors have great belief in the future success of biobanks as solutions to the disease crisis (Park 2009), a challenge arises in introducing and ensuring the sustainability of such a facility into an existing context and inducing a critical fusion between it and its dependant community. Architecture is a powerful instrument that can induce this fusion through new and appropriate spatial interfaces, systems and typologies and must therefore aid the implementation of new technologies and practices into the existing urban fabric. The traditional medical research facility must now be redefined and adapted in terms of form, programme and type that meet the needs of both the community and research laboratory, while ensuring public and privacy gradients are maintained. A contemporary research facility in the form of a biobank depends on a symbiotic relationship with its context, which consists of vital connections and the encouragement of an interaction with its community and the individual. In order to explore, develop and implement these new ideas however, the 'challenge' itself isn't simple and must be considered as a multifaceted one requiring different levels of enquiry in various scales and forms.

The first enquiry will be into the actual nature of blood, as the primary, genetic research resource that the biobank needs and stores for sustained research. While at first it may seem to be arbitrary and futile in exploring blood, it is the rich and complex notions that underlie it that have now transcended into contemporary thought and are manifested in local ideas of stigma, perception and boundaries. Understanding and acknowledging the basis of blood and its significance, can assist in addressing certain issues and boundaries, in order to ensure voluntary blood deposits are received and can therefore allow for the commencement of advanced research within the biobank. This inevitably leads to a discussion of the traditional ideas of boundaries, both physical and ideological, in the contemporary genetic age and within new infrastructures. Following this will be an assessment of the actual 'problem' of blood in society, through an investigation of stigma and perception. General enquiry also requires a referral to examples and as there is a lack of architectural biobank examples, it is perhaps best to refer to other facilities that have dealt with similar challenges, whether successful or not. Traditional blood banks and centres will therefore be referred to throughout while examining issues of public/private interfaces, boundaries, spatial and programmatic systems.

Social acceptance and perceptions (often negative) of blood in the past have been shaped by forces of power and control, namely through the institution and its boundaries. Contradictions begin to emerge in the treatment and transient state of this substance, from secure private areas of the institution, to more socially-'acceptable' public facilities like the blood donor centre and blood bank. What underlying issues and clues can be derived from these as we aim to introduce new research infrastructures? An analysis of power and the control of the body and individual through the institution will therefore be made.

From this we move to the present situation and conditions that shape the built environment. Johannesburg's urban fabric and its present disease

1 Biotechnical Age, while not a new term, has changed in meaning over the last few years with rapid technological advances and worldwide participation in understanding the biological processes of both humans and animals. This has evidently come to light in the field of human health research, particularly through the *Human Genome Project* (1986) which discovered DNA and genes as a source of information for potential future disease cures and preventions.

crisis can both be discussed and viewed as after-products of the Modern movement. What is the condition of this post-modern landscape today that has incited a transformation in both its public health infrastructures and general urban fabric? An analysis of the post-modern context is important in revealing other spatial issues that must be acknowledged and avoided, as we reorganize the city with the introduction of new technological infrastructures that should strengthen public health, through connections with their contexts and users, ensuring their success and survival. This leads us towards an understanding of a future urbanism and how other post-modern cities are following a global trend in transforming into 'BioMed' cities (Sample 2008: 69) and what their impacts may imply for Johannesburg.

The enquiry eventually concludes in a discussion regarding the architecture that should emerge in response to the post-modern city, specifically with the introduction of new technological infrastructures such as the biobank. The introduction of such a facility into an existing context raises issues pertaining to its form and programme in order to successfully integrate with its community. Through an exploration of 'transgenetic transfusions', porous edges and landscape, underlying themes of public and private interfaces; programmatic hybrids and forms; accessibility and edges should emerge as guidelines. These guidelines should inform and support the development and design process of introducing a biobank in the inner city, enabling a responsive and engaging facility that transfuses with its community and greater urban context.

"At a time when the human genome has been deciphered, where the human is set to become the stake in the law and economy of the future, it is necessary to think of a strategy for the deregulation of the norm, of identity, of standards…"

- Frederic Migayrou (MDAA 2003. Sv "Transgenetic transfusions")

The Essential Substance

In its Essence

Blood in its simple biological essence is a life-giving force. Meyer (2005:2) however challenges this notion, suggesting that the physiology of circulation made it appear that blood was central to both life *and* death. Early man discovered this through hunting: when an animal was stabbed, the blood spilled and stopped circulating thus ending life. It is this contradictory nature of the substance that has enriched it with various cultural, social and political meanings, transforming it into a multifaceted and patterned subject.

Throughout history, there has been an association of blood with its therapeutic and vital rejuvenating powers. The ancient Egyptians used to bathe in blood to regain the powers of youth, while in Ancient Romania the hypochondriac dictator Nicolae Ceausescu was thought to use young boys' blood for his own rejuvenation (Nelkin in Kac 2007:116). Blood has also been associated as a sacred substance by many religions in their holy writings. Religious followers such as Catholics ritualize the symbolic consumption of their God's blood and reaffirm a spiritual connection (Meyer 2005:6). In his book *Juice of Life*, Piero Camoresi (in Kac 2007: 115) speaks about blood as a substance "thick with magical significance, mystical claims, pharmacological prodigies, alchemistical dreams." While the value of an individual's blood for himself was unquestionable, it was the discovery of its disease-transmissible nature and blood groups that were to produce new ideas and values not only for the individual's benefit but also for the collective community. Inevitably, issues of ownership, privacy and public arose and were challenged, often resulting in social and cultural tensions driven by suspicion and stigmatization. This was clearly evident in the former Congo, Zaire, where hospital blood stock's were often guarded, as the locals suspected that blood was stolen and used for "powerfully effective European medicines" (Meyer 2005:7).

Blood has always been a source of interest and in the past centuries it was a more visible and accepted daily reality than it is today. The sight and smell of blood, through birth and death, was a biological reality for all people including barbers, butchers, midwives, phlebotomists[2] and doctors who opened, closed and treated veins (ibid). In contrast to this, blood today is a substance perceived and treated as one to be hidden and avoided due to its associations with disease, accident and even war. This negative perception has been aggravated even further by its associations with mortality and institutions such as hospitals. In contradiction, it has also simultaneously become socially acceptable as a virtual reality, enjoyed by the viewers of violent and sometimes mythical movies. Nelkin (2007:115) refers to Umberto Eco in suggesting that while our internet savvy society thinks of blood of concern only to doctors and pathologists, there is a growing new acknowledgement of past cultural myths and contemporary ideas in line with genetic-based research. Essentially, it is a substance whose perception has been continuously transformed and shaped by social, cultural and political ideologies. These ideologies currently highlight the issues of its boundaries (both physical and psychological) and control, whether through institutional responses to contamination and disease or in its new found resourcefulness in the biotechnical age.

2 Persons who treat the inflammation of veins (OED 1996. Sv "Phlebotomist")

A Social and Cultural Symbol

Beyond its essentialist meaning and significance, blood has also come to be a rich symbol of community spirit, altruism[3], and social cohesion (Nelkin in Kac 2007:118). This is evident is the historical collective rituals of various communities involving the use of blood, as well as the contemporary practice of blood donations in various public spaces such as malls within the city. Traditional rituals are essential for enhancing community and cultural beliefs. The contemporary act of blood donations is significant in creating a sense of social cohesion: a person donating blood publicly in full view of his fellow citizens, in order for it to be acknowledged.

But what is the significance of the use of blood in ritual, and what comments are being made about the body and society? Meyer (2005:2) suggests that community blood rituals explore the values of boundaries of internal purity and external danger; the body's orifices represented vulnerable zones that could be transgressed by internal fluids like blood. Thus human rituals marked and mediated these borders (ibid).

The practice of *collective* rituals within certain past and present communities also represents blood's symbolic strength of social solidarity. Nelkin (in Kac 2007:118) refers to the anthropologist Mary Douglas by implying that these rituals often represent the community's act

3 Altruism refers to an unselfish principle act by a person, particularly with the intention of helping someone else and expecting no form of capital gain. The term is often applied to the voluntary act of public blood donations.

on the political body through the symbolic medium of the physical body. These acts are often carried out in community spaces such as the centre of the village, in full view of society in order to address social issues. Douglas further suggests that pre-modern societies practiced salvation rites through blood spillage in a “dramatic presentation of collective mortification” (ibid).

An example of the practice of blood ritual in the community’s presence is that of the Ndembu tribe in Zambia. Various Ndembu people carve a specific tree during circumcision and childbirth rituals; the tree secrets a red blood-like gum that signifies blood that accompanies the ritual processes (ibid). This visible display within the community’s forest also represents the woman’s matrilineage and has a purpose of alerting the woman’s role in life and maintaining her tribal and communal continuity according to their rules (ibid). The trees in the aftermath stand as community symbols within the village, like cultural icons or monuments of its people and their beliefs. Blood’s symbol could therefore be visibly and physically transferred to the village through trees.

In contrast to this, the Dogon tribe of Mali represented an early architectural response to the stigma behind blood in the form of control. This was manifested in the construction of specific mud houses for menstruating women that were placed outside the village, exploring very real ideas of boundaries (www.wikipedia.org/wik/Dogon_people). The construction of these temporary houses served as physical means of enforcing and defining boundaries, which formed a division between the perceived “unclean” women and general community (ibid). Spatial dynamics and relationships are therefore evident in these acts of separation that are infused by an underlying concept of stigmatisation. These relationships were also emphasised visually through a distinction in physical appearance of materiality and external décor of the houses; the temporary houses were more modest in appearance compared to the ‘normal’ houses within the community. However, while the separation of the houses represents the effects of stigmatisation, ironically they also represented places of social gathering and gendered- cohesion. Stories and beliefs would be exchanged here in the evenings among the ‘residents’, non-menstruating village women and girls. Thus this type of building was a multi-faceted symbol and expression of the opposing forces of stigma and community cohesion.

Today the idea of the supply and free availability of blood within society represents ideas of social cohesion and fairness. The strength of these ideas is commonly reflected in blood donation systems and at times, stand-alone blood banks within the city. These spaces represent points of the city for social cohesion, places where the community come together in a modern ritual act of sacrifice for others. The donation of blood in public spaces such as shopping malls represents an act of public benefit that creates a sense of belonging for the donor. Quite often the traditional blood bank’s facilities are abandoned for the more favourable public spaces of consumption that contrast the sterile and controlled environments of traditional blood centres. These new found public spaces are free, open-plan in form and arrangement and avoid the restrictive barriers commonly associated with blood centres. A shift evidently has taken form, away from the institutional practices of exclusion (not always the intended effect of the blood bank) towards a form of public display, interaction and acceptance.

Understanding social and cultural issues underlying blood and the traditional blood bank, with regards to public and private gradients, can perhaps inform what interfaces are to be used and avoided in a biobank. With the new technologies available to aid the individual’s perception and treatment of self and their community, now and within the future, what impact does this have on the individual’s and public consciousness? Architecture will play an important role in providing both an accessible institution, as well as an appropriate interface between the community and the research facility, where an understanding of the value of the body and blood are continually evolving and exploited.

Image source:
http://www.healia.com

"Perhaps the most salient contradiction today follows from the instrumental value of this substance. As blood becomes an increasingly valuable resource in the age of genetics, its use is inevitably a source of strain; its value for science or commerce conflicts with its social and symbolic meanings."

(Nelkin in Kac 2007:122)

Blood as an Exploitable Resource

"With the power of new technologies, even a single drop of blood can be analysed to reveal a great deal about the individual's health and their predispositions" (Nelkin in Kac 2007:119).

The rich symbolic and pragmatic associations with blood make it a valuable body substance but this has also affected the ethical responses to its growing use for research and commercial purposes (Nelkin in Kac 2007:115). In the current Biotechnological age that constitutes a growing dependence on genetic-based research, it has acquired a new found value as a source of biological data and information. While our conventional blood tests at clinics and hospitals are voluntarily provided for private diagnostic purposes, the same blood can also be used for a comparative study of genetic basis of disease and the biological processes that are common in certain human populations. Blood is now not only a social commodity, through the donation of blood to save lives but is also becoming a valuable commodity for crucial medical research. Thus it is a fluid that raises complex notions of ethics, ownership and privacy.

Just as the use of blood in modern art is shocking to many people, so the commercial use of blood seems ethically dubious and discomforting. But why should blood, a constantly regenerated substance, not be considered as a useful and exploitable resource? Why not use blood for art, research, and even commerce? What is this substance anyhow? And what is its cultural meaning? (Nelkin in Kac 2001: 115).

As alluded to by Nelkin, there is indeed a problem with blood being used as a valuable research commodity. As discussed previously, it is a complex subject matter that is deeply tied to cultural, social and political ideas that renders it as a matter of control. History however illustrates that there has often been an acceptable use of it since the beginning of humankind: from its use as pigment to create rock art by the cavemen, to its therapeutic qualities in ancient Egypt and Rome, to its contemporary life-saving quality through transfusions.

The answer to the "problem" of exploring the resource of blood could be equated with the extremely powerful stories and myths of blood being used in mysterious and often violent ways (Nelkin in Kac 2007:121). These stories range from blood being drunk in Guatemala by colonial invaders to the disappearance of people in Tanzania whose blood, it is believed, was drank only by "the white man" (ibid). These stories paralleled with the vampire myth and related phenomenon and as a result, modern efforts to procure blood, whether for donations or genetic research, often evoke vampire metaphors. This problem is further enforced by its associations with disease, mortality and even exaggerated by sterile and unreceptive institutions that do little to address negative perceptions and fears.

Contemporary meaning and perceptions of blood reflect prevailing social tensions over race, gender and social class; as was evident in a series of xenophobia attacks that occurred in Johannesburg in 2009. The contradictory connotations of blood such as life and death, purity and contamination, altruism and greed all reflect its social complexity. Perhaps its most contradictory use is in the form of its instrumental value; an increasingly valuable resource in the genetics' age for science and health, while conflicting with its social and symbolic meanings.

The history of blood, its equation with purity and danger and social discrimination also stirs up ethical debates within society. With an increasing genetic understanding of the body, an understanding that is brought about through blood analysis after all, the powers that lie in it will shape the way that our society perceives its beneficial use and will ultimately lead to how our institutions will value it. This is increasingly becoming a modern reality with the introduction of biobanks, however with the need of greater focus on the public's awareness, education and interaction; this should ideally lead us into a new era of health care that is primarily for the benefit of the individual and general public.

Stigma

According to Goffman (1990:11) the term ‘stigma’ is of Greek origin that referred to the bodily signs designed to expose something bad or unusual about the moral status of the signifier. However, the term today is more widely used in referring to something such as a place (as evident in the Dogon “menstrual houses” discussed earlier), idea as well as a person that is different from the social norms or perceived as a disgrace than to the actual bodily evidence of it (ibid).

Society establishes a stigma based on a certain person, quality and circumstance. This inevitably leads to a categorization of persons/ subjects and their complimentary attributes that are seen as natural for the members of these categories (ibid). Goffman suggests that the historical and existing stigmas can be attributed to skin tones, physical and mental disabilities as well as disorders and diseases.

Blood in the same manner has often been stigmatised, specifically due to its attributes of a disease carrier. This stigma has become even stronger due to the modern reality of HIV and its terminal nature. The stigma of blood is further exaggerated with the actual visibility of it and as a result, society often associates it with the body’s malfunction which in turn further extends it to a perceived relationship with a hospital. Consequently, blood drives and blood banks are at times perceived negatively and are categorized with institutions associated with disease and morality.

While the social stigma of blood may partially lie with its history and attributes, architecture (specifically the institution) has also had a role in exaggerating and aggravating the stigma even further. A building’s power lies in its ability to present a certain perception to the public, a perception that is linked to what is inside and what might be happening inside it. Institutions that are commonly associated with blood, such as hospitals, clinics, blood banks and research facilities, often amplify existing negative associations due to their sterile or unreceptive interior and exterior forms and monotonous spaces (i.e. forms of public interface).

However, architecture and design are also powerful in addressing these negative perceptions by creating and presenting new, positive forms and spaces that are not only presented to the public, but may also entice individual and community interaction and inform society of what can and should be socially acceptable. Architecture can thus help to overcome certain stigmas and instigate them. It is this strength of architecture that must be acknowledged and used when designing facilities such as biobanks, in order to prevent them from being stigmatised. With new, appropriate design and new forms, architecture can create new, positive representations of a place that in turn can produce potentially positive perceptions of it.

An example of this is Matharoo and Associate’s Prathama Blood Centre in Ahmedabad, India. The task of the project was to remove the repulsion normally associated with a medical facility, into a playful and intuitive receptacle, thereby transforming it into a receptive public domain (http://www.matharooassociates.com/). This was successfully achieved by both interior planning but more importantly by the playful, curved physical forms and appearance of the building. The building’s hypnotic, sculptural forms thus avoid the traditionally, negatively perceived plain white, rectangular facades traditionally associated with post-modern institutions. This is complimented by naturally, brightly lit public spaces, lush gardens and a koi pond. The success of this design is evident in the increase of voluntary public donors and has also become a public facility for leisure, often being compared to a salon (ibid).

The example represents the strength of a well designed building and its positive affects in changing social perceptions. Architecture is a powerful medium in addressing and engaging with a community and its beliefs. Through the creation of new spaces that provide a better public interface and encourage interaction and awareness, architecture and the built environment can become instigators that can aid in addressing and overcoming the stigma of blood. New spatial environments can induce awareness, self-knowledge and public participation within a community.
A simple example of this is the placement of a community vegetable garden in the Hillbrow Health Precinct. The precinct’s information officer Pascal Minani (2011) refers to the vegetable garden as a “community space” where all people, sick and healthy, come together to work and learn. This ‘natural’ feature is perhaps best understood as a space which adds a sense of domesticity to the otherwise impersonal environment associated with clinics and hospitals in post-modern Johannesburg.

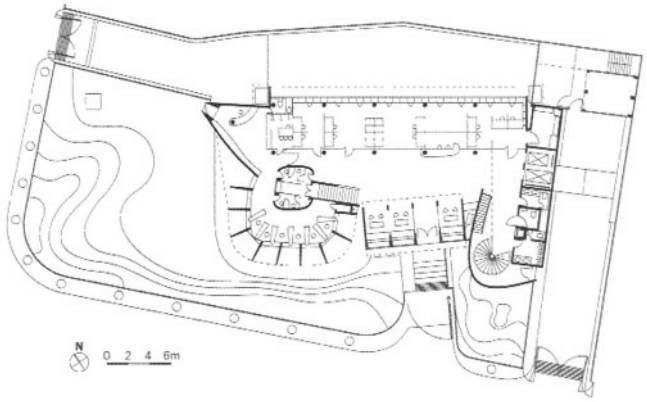
All of these ideas need to be considered as we enter the biotechnical age and where new facilities such as the biobank emerge and rely on a critical engagement with its surrounding community and context. New typologies and forms of public interactive spaces are required as well, so that these new facilities will not be negatively perceived and attached to an existing stigma.

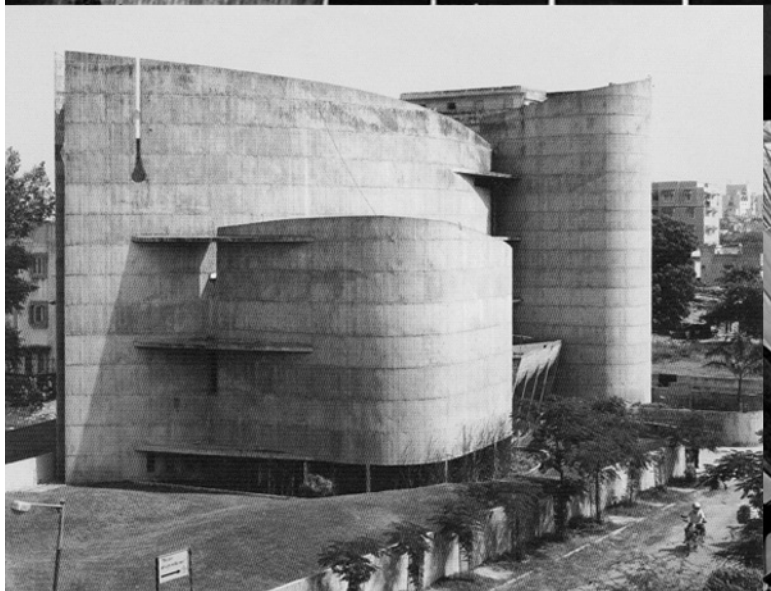
> **Prathama Blood Centre**
Ahmedabad, India.
Matharoo & Associates

The building's curvaceous and playful forms are successful in changing the often negative perceptions of blood centres. The facilities and internal atmosphere have often been referred to as that of a salon, as seen in the far right image of the donor centre that floats on a koi pond.

Ground floor plan below.

(Matharoo and associates: 2009)





Perception

Perception is defined as a process in which we see and understand things in our world, through an acquired knowledge of the objective world. Noe (2004:1) suggests that perceiving is also a way of acting. It is something we do within the objective world that this provides knowledge acquired by the perceiver through their sensory interaction. Noe (2004:32) further implies that our perception is also informed and affected by not only what we do, but also what we *know* and the context in which we perceive something. Thus the perception of something is often affected or understood in accordance to the perceiver's past experience or knowledge.

Perception is such a strong phenomenon for the individual and their understanding of self, a particular situation or object. Our perceptions are greatly influenced by both our natural and non-natural environments. It is how we interpret acquired knowledge and awareness through our senses; in addition, what we perceive is heavily shaped by social, cultural and traditional ideologies.

It is certainly evident that our perceptions of our bodies and its fluids that have been shaped and heavily influenced by social elements, such as the media as well as institutions such as hospitals. While blood itself is contained within the body, understandably the moment it leaves the body, we associate it as a problem and thus create a generalised negative perception of it. The very thought or sight of blood to many is a constant reminder of disease and their mortality. A shared perception is that the moment blood leaves the body or system, it signifies that there is something wrong or that there is an impending death.

Society, specifically through culture, shapes our perception and creates a grip on our contemporary psyche. This perception is explored by the contemporary artist Marc Quinn[4], who through various works highlights the distanced relationship we have with our bodies and that there is a conflict between natural understanding and cultural understanding (http://www.wikipedia.com). In one of his most acclaimed works entitled *Self* (1991), Quinn uses his own blood to produce a frozen sculpture of his own head. This is continuously re-done every five years and is meant to illustrate to the viewer the fragility of man's existence and our continuous physical transformation and deterioration. The one element that remains unchanged, or *visibly* unchanged over the years, is the actual nature of the blood with the aid of modern technology. Modern technology has enabled us to defy nature and create new ideas and new forms of control (such as biobanks) according to our own preferable aesthetics or perceptions.

The manner in which we perceive our environment (both natural and non-natural) is a multi-sensory experience. However, Noe (2004:2) suggests that vision is our most informative sense from which we can acquire the most knowledge of our immediate environment. Vision is

4 Marc Quinn is a British artist whose other key themes include genetic modification and hybridism, through the exploration of DNA and sub-zero preservation technologies. Through various works, Quinn mediates on our understanding and acceptance of human life through scientific knowledge and artistic expression ([O] http://www.wikipedia.com).

^ *Self* (1991) explores perceptions of ouselves and bodies, specifically in a socially and culturally- conditioned state.

(http://www.wikipedia.com)

also important in terms of creating comfort, both mental and physical, for the user of a particular space. We can gain a significant form of comfort from the visibility of natural elements and nature, perhaps even framed by a window, without actual being in it. This has significant implications when it comes to designing appropriate and approachable spaces and public interfaces, specifically when dealing with private matters of the body. Design is also important in providing appropriate spaces and uplifting learning environments that induce positive public participation and education.

An example of design that successfully promotes public participation and education is Zaha Hadid's Phaeno Science Centre in Wolfsburg, Germany. The purpose of the facility is to create and open up new perspectives to science and technology for the public. Seductive, new forms and vibrating interiors absorb the general public into a world of surprising new perspectives and unexpected spatial relationships (www.arcspace.com/architects/hadid/phaeno/phaeno.html). The result is an exciting architectural form with inducing environments that "reawaken the desire for making discoveries of one's own" (ibid). Hadid's design strategically lifts the building up, allowing an open and free flowing ground floor to be used by the public. The building's 'edges' are broken, porous and lack any physical barriers. The building is also comprised of different forms and surfaces which avoid the traditional static and standard forms within research typologies. The success of the design is evident in the centre's high public attendance and therefore changes peoples' perspectives of scientific discoveries that are often associated with dark, mysterious and solitary labs with white-cloaked scientists running around.

Buildings such as Hadid's Phaeno Science centre and many other highly celebrated ones, illustrate the past period where architecture has been predominately occupied with creating a striking and memorable visual image. Pallasmaa (1996:19) criticises this practice where "architecture has adopted the psychological strategy of advertising, of instant persuasion, and buildings have turned into image products detached from existential sincerity". If we as a conditioned contemporary society are living in an information age and are fixated on appearances and instant visual impacts, as Pallasmaa suggests referring to Fredric Jameson (ibid), then surely architecture can use this to its advantage.

Pallasmaa may be correct in his criticism yet this may also be seen in a positive light in changing negative perceptions of particular buildings and institutions. Architecture can then also be viewed as a powerful tool, specifically through alluring yet appropriate forms, that can draw people together and at times change their perceptions. Along with appropriate public spaces and interfaces, served by suitable programmes and use, architecture can be beneficial in addressing the negative perceptions of places associated with blood. This again needs to be seriously considered when designing a biobank and appropriate public edges, interfaces and new forms that can infuse interaction.

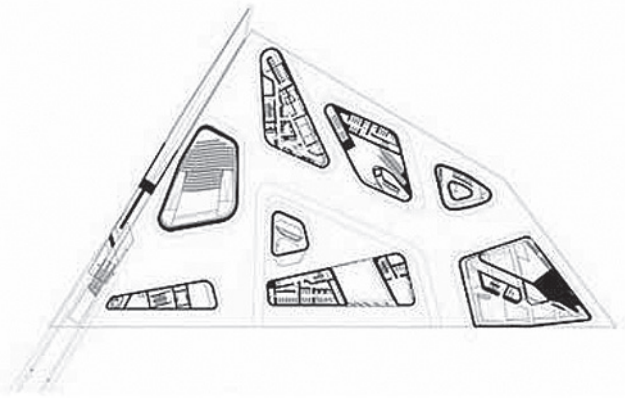
In an interview process of a small group of people, conducted by the author, it became increasingly obvious that architecture is quite powerful in creating new or emphasising exiting perceptions associated to a particular object. When asked about what their views of a blood bank were, a majority of interviewees spoke of dark, dingy spaces that resembled a dungeon. Others spoke of "cold" basements for storage or the same atmosphere of a hospital: sterile, cold, uncomfortable and often impersonal. This illustrates a strong relationship that exists between spaces of use and the individual, and must be considered as we develop new biotechnology typologies in the city.

< **Phaeno Science Centre**
Wolfsburg, German.
Zaha Hadid

The building opens up new and exciting perspectives of science and technology for the general public, complimented by interactive interiors.

Ground floor plan below.

(Meyer,T. 2009 [O] www.arcspace.com)



Power and Control

As discussed in the previous chapter, the Modern movement introduced forms of control within the city that primarily sought to keep it ordered and 'healthy'. In Apartheid Johannesburg, individuals were controlled within the city and by the state based on racial lines. Boundaries, both physical and invisible in nature, were set up as lines of exclusion and control. The state not only controlled the *physical* body and its movement in the city, but also its free choice.

The ideas of power and control of the body and its fluids, expressed through architecture and urbanity, can be understood by an investigation of the institution, the individual and the body, the present environment and the emerging environment of the biotechnical age.

The Institution

The development of the institution provided a means of creating an ordered society. Institutions encouraged new forms of control, such as discipline as a form of self-regulation that permeated into modern society (Mills 2003:43). Architecture has thus been vital in expressing and carrying out this power and order through reorganizing the spatial relationships of unity and standardisation, through new inventive solutions such as hospitals, clinics and prisons (ibid). Mills refers to Foucault in suggesting that these institutions emphasise a discipline which is concerned with control within and by each individual, such as time-keeping, self-control over one's body posture and bodily functions (ibid).

The relationship of the body with an institution, specifically in dealing with its well being through monitoring and control, is currently represented by the hospital. Modern medical institutions treat the (sick) body and its fluids as potentially unclean because they can be carriers for infectious diseases. The institute thus uses universal precautions and practices, such as setting up hygiene boundaries to avoid the exchange of body fluids and diseases.

Power is often seen as a possession, something held by those who in power and imposed on those without it. Foucault (cited in Mills 2003:35) criticises this view and suggests that power is more like a strategy which can be performed and not owned. He further emphasises that power is more like a network of relations spread throughout society. " Power must be analysed as something which circulates, or as something which only functions in the form of a chain…Power is employed and exercised through a net-like organisation… Individuals are the vehicles of power, not its points of application" (ibid). There is thus a constant exchange of ideas between the individual and the institution. This exchange results in power that is both received and enacted upon by the individual. The hospital exercises its power through an individual using a system of treatment. The individual seeks medical attention which is provided through consultation, testing, treatment within a confined space and then finally discharge. Parallel to this, a medical research facility exercises power through its ability to produce new cures and implement this back into society at its own discretion.

Power as mentioned earlier exists as a set of relations throughout society and cannot be merely located in a particular institution such as a government. It is a force; a system which Althusser (cited in Mills 2003:36) suggests is represented as ideological values represented through various apparatuses such as the public health system. The formal physical embodiment of the values of general public health and prevention of disease are represented and carried out through the hospital, clinic and even research facility. These are all formal elements which intervene in the event of a threat to the general public's health; they are elements which are intended to control the spread of disease and the diseased body in the city that contribute to an effective public health system.

The hospital, medical research laboratory and perhaps even the traditional blood bank, represent strategic points of public health intervention. They are points where the individual can be strategically used to providing the state with information about the general public's health, which can then be acted upon, through media campaigns and the pursuit of new treatments and medical technologies.

However, one can argue that the institutional framework can be perceived as problematic in certain ways. The institution practices power in controlling and curing the disease, informing the individual of what treatment should be taken and then they are discharged. This has little effect on the institution's role in providing general wellness and prevention by making it more sensitive to the public and providing spaces that encourage education and interaction. Quite often the visual architectural language of these institutions illustrates the pragmatic role of dealing with disease; clinical and practical facades are kept to the minimal, acting as boundaries that contain the diseased. The result is often an impersonal architecture that is primarily focused

on the dealing with the threat of disease rather than the individual and their context. If power is a system *between* the institution and the individual, what more can the individual gain more from institution other than medical treatment?

Traditional research labs and blood banks/centres, such as the Auckland Blood Centre in Johannesburg, also present themselves to the public as anonymous forms. This centre does very little through its formal appearance and architectural forms to suggest or reveal to the public what is done inside. There are no formal public spaces and features such as a square or garden that invite people into the facility. Instead the building screens itself from the street and public gaze, through high palisade fences, electric fences and dense shrubs. The building is introverted, ironic in that it thrives on one element: public interaction.

"The problem is that we are very isolated. It bugs me that there isn't enough awareness of our existence [here] in this building. Sometimes only one person will come in to donate in one day.
There are some days when not a soul will walk in; we sit here from 8am till 5pm doing nothing."
Sister Jenny, Donor Assistant at the Auckland Park blood centre (Author's own interview 2011).

Little is done to address these facilities and their forms of engaging with the community and addressing the negative perceptions that are often associated with them. Instead blood services such as the South African National Blood Service (SANBS) have been forced to move away from their centres and interact with the public at more convenient public spaces such as shopping malls, schools and banks. With the aid of the mass media to gain the public's attention, this new outward movement is increasingly effective in accumulating the required amount of blood units. What this suggests is that physical forms and interfaces (including spatial) need to be considered carefully when introducing a biobank. It suggests that the public are more comfortable to engage and donate in spaces of consumption and leisure (such as shopping centres), where they will also receive social recognition for their contribution.

"I don't really like coming to donate here [Auckland Park blood centre], I prefer doing it in the mall. Over here [Auckland Park] it's very austere and it smells of the disinfectant…it reminds me of a hospital, I don't really feel comfortable… I feel like I'm coming for a check-up rather than to donate blood for a good cause." Monique, blood donor (Author's own interview 2011).

One can be reminded of the power of architecture, specifically through the institution, that can influence social thinking and behaviour. Discipline should be understood as a set of procedures, strategies and ways of behaving that are commonly associated with a certain institutional context that have permeated into the social conscious and ways of behaving in general (Foucault cited in Mills 2003:44). Like the discipline founded in prisons which has now transfused into the army and schools, perhaps the general social attitude towards blood, specifically through public donations, has been socially linked to the treatment of *diseased* blood in the hospital. Does this demonstrate the power of social interaction and education; nurture versus nature? It may also illustrate the comparative failure of the blood bank centre and the success of blood donations outside and away from the clinical spaces and impermeable facades that are linked to the institution.

The institution, such as the hospital and medical research laboratory, are therefore instruments to implement power through disseminating the state's public health policies whilst monitoring, controlling and preventing future crisis to the general public's wellbeing. However this power is in a system, distributed between the individual and the institution. The institutions are operated and constrained by the individual's and community's health needs that are constantly shaped according to new technologies. The introduction of new technology infrastructures such as the biobank heavily depends on the improved value of the body and individual (their blood sample and general history) and suggests an inevitable shift of power from the institution to the individual. Power is now exercised by the individual and within the social body (Foucault cited in Mills 2003: 43) and new research typologies must acknowledge and address this through appropriate forms of boundaries (including privacy boundaries) and interfaces that ensure their success.

> The Auckland Park SANBS centre. This ‘public’ facility is poorly located and isolated on a quiet street. Physical boundaries prevent any connectivity with the street or an pedestrians. The architetcural form does little to induce a visual connection with its surroundings. Instead the buildings facades are ‘sterile’ and anonymous, revealing little of what is done inside.

The Individual and the Body

The individual is a subject in which power and control is enacted upon by the state or institution. The hospital is an agent of a greater authority of the public health system set by the government, through control and discipline of the body and its functions. The individual's body is a site where power is enacted and resisted (Mills 2003:82).

However there is a distinction which must be made clear between the individual and the body. Mills (ibid) alludes to Foucault's idea that the individual is a product of an effect rather than an untouched essence. Individuals are in fact constrained, defined and shaped by exterior forces. The individual therefore is controlled by the notions of the power within the hospital (and indirectly within research facilities); their fate depends on the disciplinary agent such as the doctor, and how much control they wish to inflict on the individual through treatment and observation. Often however, the individual can shift the power relationship and chose not to seek medical attention and treatment and completely ignore the advice of the doctor.

"The individual is not to be conceived of as a sort of elementary nucleus…on which power comes to fasten…In fact, it is already one of the prime effects of power that certain bodies, certain gestures, certain discourses, certain desires, come to be identified and constituted as individuals." (Foucault cited in Mills 2003:82-3)

The body is thus affected by certain processes, such as political and social ideas, which transform it into a specific state. In addition to this, bodies are always subject to change according to the social context and the historical period (ibid). Our bodies are always viewed and treated differently and this is included in the progression in medicine, research technology and their associated spatial contexts.

This is evident in the basic introduction of the blood bank prior to WWII, where the value of the body, specifically the new-found scientific value of blood, brought about an urgent need for a safe and satisfactory way of the storage and preservation of the valuable life-fluid for future emergency transfusions (DeBakery and Kilduffe 1943:196). Various medical difficulties (like the transmission of disease) as well as a general public reluctance to acceptance the procedures also emerged at the time (ibid). A response to this did emerge however: the development of a specific and appropriate building (Blood centre) came about where the public could come interact and donate in comfort, while their blood was collected, tested, preserved and stored. In this manner, architecture was used as a platform to formalise this participatory use of the body: creating an appropriate, interactive and receptive public space (often detached from the hospital). The appropriate, public spatial-interface therefore induced a transaction and trade between the individual and institution: a space that displayed the power relationship between the body and institution.

Foucault (cited in Mills 2003:83) argues that it is at the level of the body that much regulation by the authorities from the nineteenth century onwards enacted on and consequently called for new appropriate spaces that dealt with issues of the body. As a result, new knowledge was gathered, populations were observed and surveyed, procedures for investigation and research about the whole population and of the body in particular were refined. The government could then act on improving the general welfare of the population, through the eradication of venereal disease and the provision of new public facilities that would improve the individuals' lives, activities, work and joys (ibid). With new diseases emerging and spreading in our cities, we are beginning to see this cycle taking place again, through the emergence of new health facilities such as the biobank that will in most cases aid the government in improving the general welfare of the public.

In view of all these ideas, it is evident that a form of discipline imposed on the body by the system (public health) is constant, so that the general population can be monitored and controlled. Power relations are carried through the body and its associated treatment and appropriate spaces. This form of control is often so powerful, that one couldn't imagine the effect of the body without it today. As we delve further into the biotechnical age, questions of access and awareness become importantly relevant, in gaining new understandings of the body.

The Present Environment

Since 1994, the period of transition into a democratic society saw South Africa open up to the world and new discoveries. The new government invested heavily in services and new infrastructure such as schools and hospitals, in order to cater for the major population of the previously disadvantaged. The state practiced control of the public's health with free access to local hospitals and clinics, complimented by private institutions that catered for the wealthy few. The state was at a crossroads position of providing primary health care facilities for the poor, while dealing with a contrasting demand of world class hospital and research services for the affluent community (Purves 2002:179). South Africa was in a state of sharp medical contrast; carrying out the world's first heart transplant operation against the backdrop of a dire lack of rural health care clinics.

"The newly acquired sovereignty has enabled individuals to explore previously unavailable urban spaces, to develop innovative forms of political mobilization, and to access, in new ways, health services that had once been forbidden to them." (Le Marcis 2004:453)

However, parallel to the period of democratic transition, there was an increase in the country's HIV epidemic, which was far more severe in townships and high density, inner-city areas such as Hillbrow, Johannesburg. The situation worsened with the increase of more severely-associated diseases, particularly in areas with weak or no public health care facilities. With the newly obtained freedom came a newly obtained problem of disease (ibid). There is however some hope and light that has emerged in the biotechnical age with its promising technologies and infrastructures.

With a change in government in 1994, the public health policy in relation to the provision of health care facilities also changed. The State's new intention was to shift emphasis away from first world hospitals and expensive specialised facilities to community-based primary health care facilities (Purves 2002:179). The state therefore implanted universal access to primary health care and free health care to pregnant women and children. There was a new approach to investing in preventative healthcare services and facilities that were both effective and easily accessible to all ([O] www.joburg.org.za). The architecture of new clinics and other health care facilities also "needed to reflect the *new South Africa*" (Purves 2002:179). They became architectural representations of service to all; a representation of the shift in power from the state to the individual, from the invisible to the visible, from exclusion to inclusion, from present into the future.

The Emerging Context of the Biotechnical Age

"Every person on Earth shares 99.99% of the same genetic code."
(Ferguson in "The Human Genome: Poems on the Book of Life")

We are at present in an era of change that has had a cultural effect on society. The invention of the computer and internet brought us into an information age where each of us can easily access information from anywhere in the world and allows us to easily connect to each other. This connection has also crossed boundaries and has expanded into the medical realm, specifically with recognition of the genetic basis that all humans share. This genetic basis has inevitably led to new forms of treatment and research in the biotechnical age. Contemporary biotechnology in an era of the information age has had an effect of enhancing society's awareness of self and traditional biotechnology (Kac 2007:1).

The development of the Human Genome Project and further research into the human body brings with it important social benefits in terms of general health and a better social consciousness. With this however, comes a threat to the individual, the exploit of an individual's body and loss of general privacy (ibid). The treatment of blood as a source of information, transforms this humankind's patrimony into a social commodity that can be used as an instrumental tool; stored and exploited in discrete units. With this comes the challenge of preventing its use for capital gain, focussing rather on its use for the well being of both the individual and the social body. The result is a blurring of boundaries and fusion between the research facility and the body and the institute and the community

This new social realm of the biotechnical era for the benefit of the individual suggests a rethinking of the institution's control of the body. Mills (2003: 81) refers to Foucault's view of what he terms 'bio-power', where there be consequent changes on the state's analysis of the general population with "increasing organisation of population and welfare for the sake of increased force and productivity" (ibid). With this new era we see new facilities emerging for the benefit of the public such as the biobank (Park 2009:36). In a *Time* magazine issue entitled "Ten ideas that are changing the world", Alice Park suggests that biobanks are having a huge impact on how we are preserving our blood and researching for new treatments and possible diseases. The resulting infrastructure and services will have a profound beneficial impact on the general public health; where new forms of cures, knowledge and therapies can be formed (ibid).

In view of these new research facilities, the roles of biotechnological research will "…affect the health of the individual but will also impact social relations… Just as they influence notions of personal identity, they also change cultural patterns" (Kac 2007:3). With the

advance in technology, we see new medical services and research facilities that are becoming a reality for the mass population. This will inevitably result in a new culture of treatment, use and understanding by the common man. Just as the discovery of blood groups led to the realisation of blood donations for others and hence led to numerous new public facilities such as blood donor centres and blood banks, so too should biobanks transform parts of the city, infusing it with new forms of public spaces that induce interaction and understanding of the growing dependence on genetic research.

Architecture has an important role to play in enabling the crucial exchange between the community and laboratory, between the public and private aspects of biobanks, specifically through appropriate interfaces and general accessibility. Referring to the Russian theorist Peter Kropotkin, Kac suggests the great importance of mutual aid “for the maintenance of life, the preservation of species, and its future evolution” (ibid). Transformation is required, in the manner that the individual will interact with the institution, where simultaneously there will be an exploration and understanding of the body which addresses the curiosity of the individual. Beneath the questions of what will remain private and public in the biotechnical age, lies the importance of questioning how life will be reconstituted and how we will be made to understand *life* and disease in the public domain (Thacker in Kac 2007:32-33).

> As the city continuously transforms and adapts in line with new technology infrastructures, traditional research facilities such as the NHLS (seen in the foreground) must adapt and engage more with their contexts and community.

Post-Modern Context and a Future Urbanism

The urban condition and many architectural theories of the past decades reflect the ideas of the modern city as one which is rational, planned and functional at many levels. The Modern movement's dogmatic and scientific approach to planning and constructing, both on an urban and architectural scale, developed a successful means of meeting the functional, sanitised and ordered needs of the city. However, this has resulted in the general loss of humane requirements including quality spaces of pleasure, delight and communal interaction (Clear & Borden 2009). The present situation where urban health is consistently challenged by the ongoing spread of disease also highlights the failures within the obsolete modern city paradigm. This is currently being addressed by the introduction of the 'BioMed City' which will be discussed in the next chapter.

The Modern movement's drive and facilitation by technological development in the industrial systems of mass production could be attributed to the current urban state. Adding to this poor urban condition are the highly-visible forms and infrastructures that assisted with the flows of organic material and waste which are large in scale and often invasive in the natural environment (ibid). Architects such as Le Corbusier and Mies van der Rohe sought to illustrate the significance of the machine, its efficiency and the industrial processes in their architecture by directly borrowing elements from the machine. Eventually straight lines, uniform societies, highly organised and ordered spaces had emerged in attempt to unify land, people and buildings in an efficient manner (www.wikipedia.org). Many critics such as Nan Ellin (2006:1) suggest that Modernism has enabled our cities to become places of disconnection with inhumane environments with random void spaces such as those found in alleys.

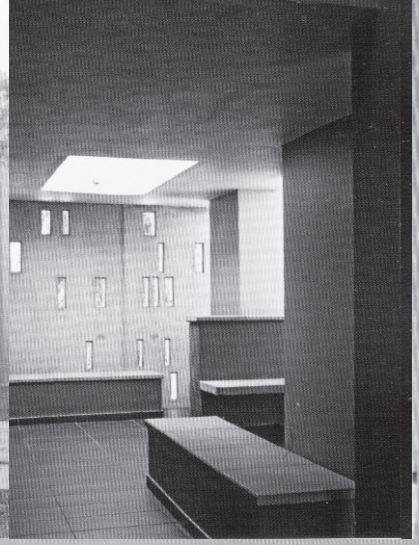
However, this urban state with its awkward, hidden and void spaces shouldn't and cannot be ignored. Instead critics believe it provides an opportunity for reinterpretation and revitalization with changing systems and new technologies. As Clear and Borden (2009) suggest that the current urban landscape needs to be discretely transformed through "subtle transformations and augmentations of the technological infrastructure." These transformations, whether through connections, re-planning or new ordering, should ideally lead to some form of unification within parts of the city or if possible the entire system.

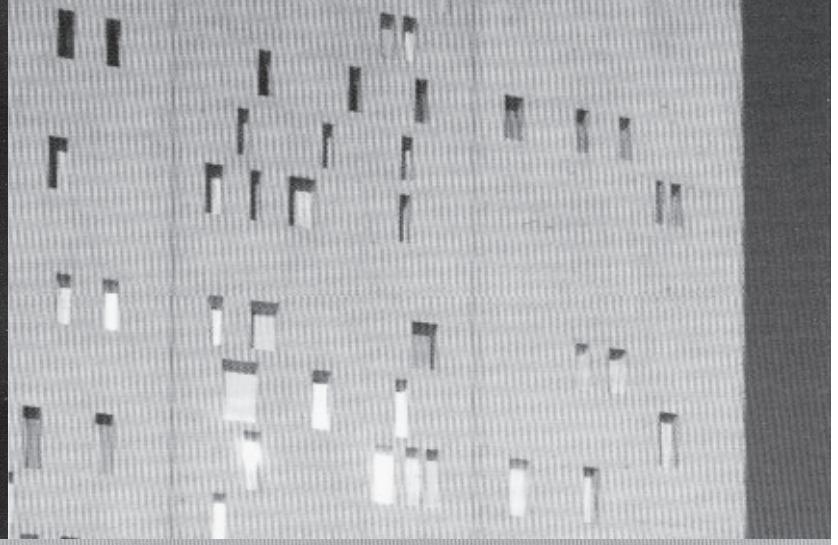
Although the Postmodern movement grew in an attempt to respond to the ills of the Modern period, specifically through addressing and responding to elements of the local context (Ellin 2006), the underlying principles and effects of the Modern period are still evident and in action. Assessing post-modern Johannesburg in the contemporary context of new information systems and technologies of the 21st century, such as the biotechnical, it is perhaps best to understand the idea of connectivity (or lack of it in certain circumstances) within the city. This is necessary in order to establish a vital relationship between a newly implemented biobank and its dependant community. New technologies such as the biotechnical however, often consist of invisible or hidden systems such as DNA and the microscope that "do not celebrate their technological status in the same fetish manner of earlier 'machinic' technological disciplines" (Clear & Borden 2009). This presents an aesthetical challenge for many designers and architects: representing any recognisable, functional attribute through the physical.

What this does imply however, is a shift and emphasis towards the interface, which has suddenly replaced the machine as the icon of the contemporary capitalist city (ibid). This interface may exist on various levels of the physical or virtual, whether through a building, wall, poster or even a place of communication such as a classroom. However one could argue that postmodernism has strategically disabled many forms of the interface between parts of the city and its inhabitants, in order to assert some form of control and order. This is evident in traditional research institutions that often depend on blank and impermeable walls that prevent any communication with passers-by or the city. While this may be a pragmatic solution to maintaining interior controlled environments required for advanced scientific research, little is done to visually engage with the institution's surrounding context and general public. The result is an 'alien' building which renders itself anonymous and is disconnected from its surroundings.

This may also be attributed to the general sense of fear within post-apartheid Johannesburg that has shaped and defined numerous 'public' spaces as introvert. The result is a city that has been engulfed with barricaded spaces through high walls, electric and palisade fences and a diminished sense of community that are all successful in keeping the public out.

The National Tuberculosis Reference Laboratory by studioMAS in Johannesburg seeks to transform ideas of traditional research facilities by attempting to create a visual interface that allows passers-by to experience the building. This interface is in the form of a morphing façade of punctured windows in the pattern of a DNA





< **National Tuberculosis Reference Laboratory**
Johannesburg, South Africa.
StudioMAS

The architects attempt to visually engage and connect with its context and street, through a morphing facade that plays with light throughout the day, while maintaining controlled, private interiors.

(McLaren, T. 2009. *Digest of South African Architecture*).

code that illuminates at night, transforming it into a street-facing 'billboard' of ongoing research. The façade also allows for views out from within, connecting researchers to their external environment (Peres 2009: 22). Even though this example merely represents an attempt to *visually* engage with the street and indirectly with the community, it does suggest an important and appropriate idea of responding to the post-modern urban context through the conceptual idea of connecting with the street and community (Ellin 2006).

Connectivity through a *visual* form or surface can be an important and successful element within a system of interfaces in an existing community. Professor Debbie Glencross[5] (2011) emphasises that it is the visual which is "…able to capture the common man's mind. If something *looks* highly advanced and *different*, then it gives the impression that some *new* and exciting forms of research are taking place for his benefit. That common man will be intrigued and *will* want to go find out what it's about, at his *own* will."

In view of some of these ideas, it is clear that certain modernist principles, although successful for their time, have also failed in providing for the human and community. This has resulted in our current urban condition which must now be reconsidered seriously, when implementing new technological infrastructure in order to ensure their long-term survival and use. New technologies and their impact on the city and its inhabitants should be read and understood as forces that transform the city towards what Clear and Borden refer to as a 'future urbanism' (ibid). The future urbanism must be autonomous and self-sufficient in order to ensure a continuous growth that will benefit its inhabitants. What are required are transformations and new ideas on both an urban and architectural level, thus requiring an exploration of boundaries, hybrid forms and general social connectivity.

5 Debbie Glencross is an Associate Professor at the Department of Molecular Medicine and Haematology at the Faculty of Health Sciences, in the University of the Witwatersrand and the National Health Laboratory Service in Johannesburg. She is an advocate of the implementation of new research facilities, such as a biobank, into developing and existing communities such as Hillbrow.

A New City System: 'Biomed' City

A growing global urban movement known as the 'BioMed' City (BMC) has recently emerged in response to recent public health crises over the last few years. Hilary Sample, a designer and critic, if one of the very first few critics to highlight and discuss this movement and what constitutes its nature. The BMC involves the implementation and focus of advanced high-technology and research facilities, within the existing city as forms of defence (Sample 2008: 69). This implementation ranges in scale from complete 'BioMed' cities, to concentrated biomed cluster developments within cities, to even a single building. In order to engage with both the city and its inhabitants, the BMC combines advanced research with elements of everyday life, consumption and commercialization.

Sample (ibid) suggests that it also forms a new paradigm for the advanced organization of a city, based on implementing new technologies and built forms that strengthen and support urban public health. This inevitably creates a fusion of new, advanced technologies with existing post modern public health infrastructures, public spaces and the city's inhabitants. These newly created proximities therefore require an establishment of collaboration among scientists, medical practitioners as well as urban planners and architects.

The BMC itself depends on a specific architecture that meets both its programmatic requirements (the betterment of human health and breakthrough of new cures through research) and its ability to adapt to and adopt changing technologies. More specifically however, the architecture attempts to sustain itself and engage with the local public and context through elements that promote and integrate public consumption but are still within the limits of the BMC. These elements include research labs, hospitals, meeting areas, auditoriums, public lounge spaces, retail, education spaces, exterior gathering spaces, pharmacies, clinics, massage therapies, health clubs, gardens and libraries that can easily be adapted into an existing urban fabric through existing or new infrastructures (ibid).

An example of a BMC at a larger scale is Zaha Hadid's master plan for the *Biopolis One North* in Singapore. The complex which was completed in 2006 consists of various medical research and science facilities but provides support and engages with the local community through the provision of retail and leisure facilities. These facilities border outdoor meeting spaces that Hadid designed to encourage public interaction and an open epicentre was also designed to encourage the exchange of ideas in public spaces (http://www.a-star.edu.sg). The overall scheme promotes private biomedical research and development but also a collaboration between the private scientific community and the curious public.

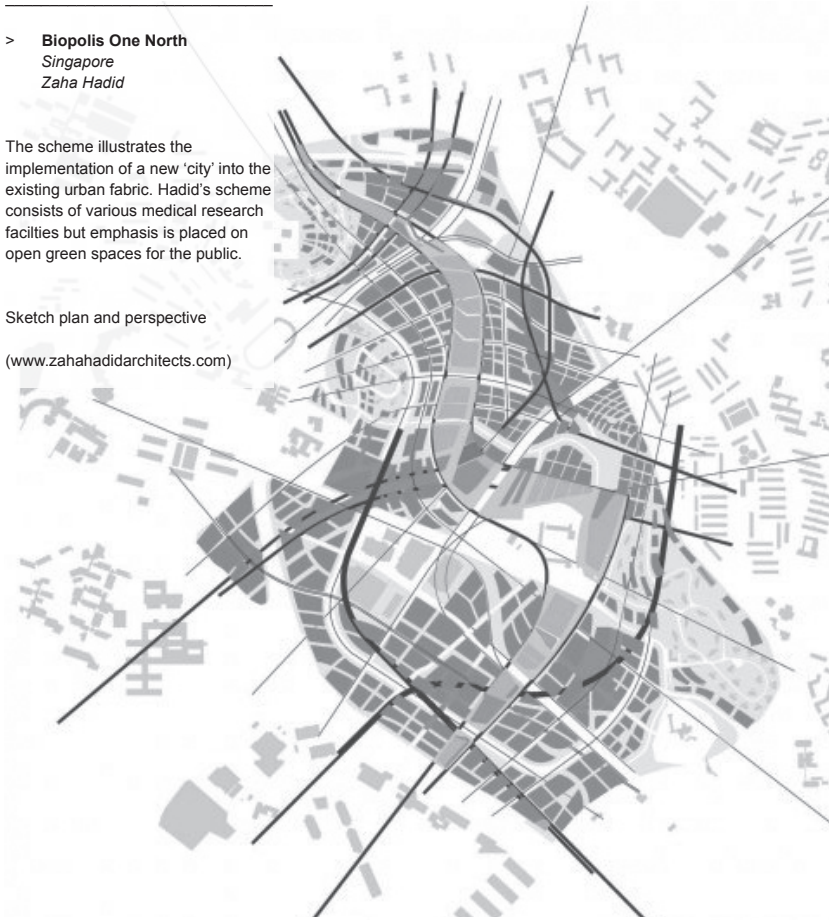
Another initiative that seeks to implement new technologies and engage with the public, although at a smaller scale, is the *International Centre for Life* in the UK, designed by Terry Farrell and Partners. The centre, located in the city centre, consists of a mixture

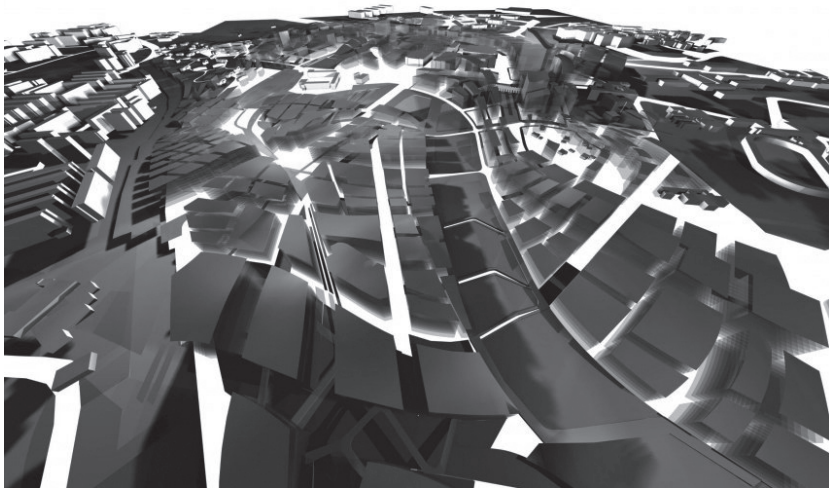
> **Biopolis One North**
> *Singapore*
> *Zaha Hadid*

The scheme illustrates the implementation of a new 'city' into the existing urban fabric. Hadid's scheme consists of various medical research facilties but emphasis is placed on open green spaces for the public.

Sketch plan and perspective

(www.zahahadidarchitects.com)



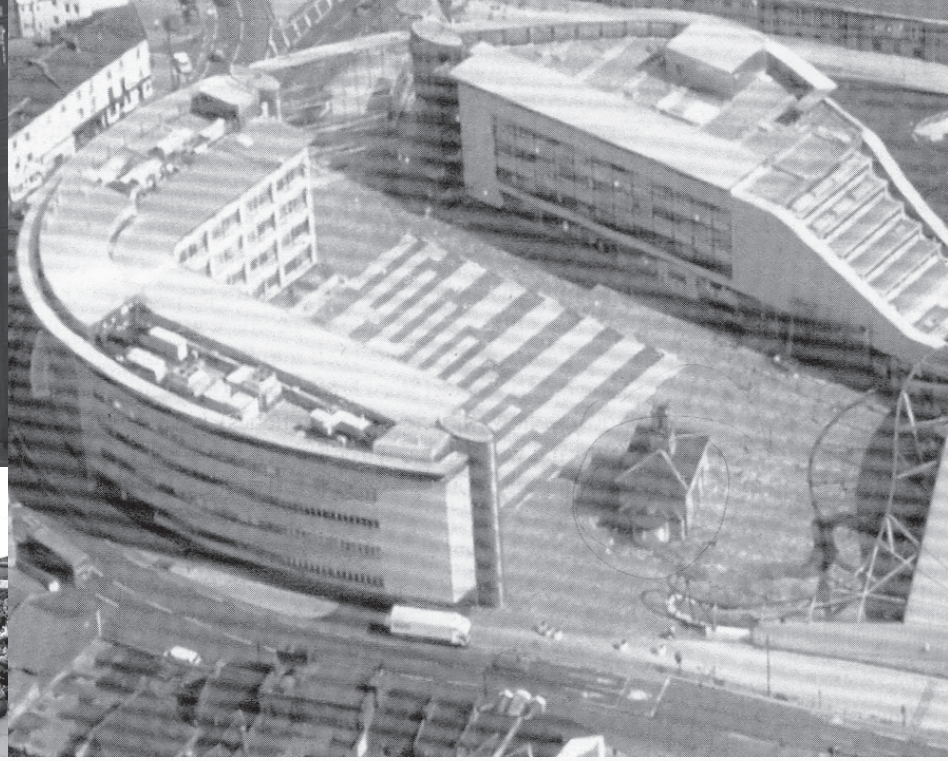


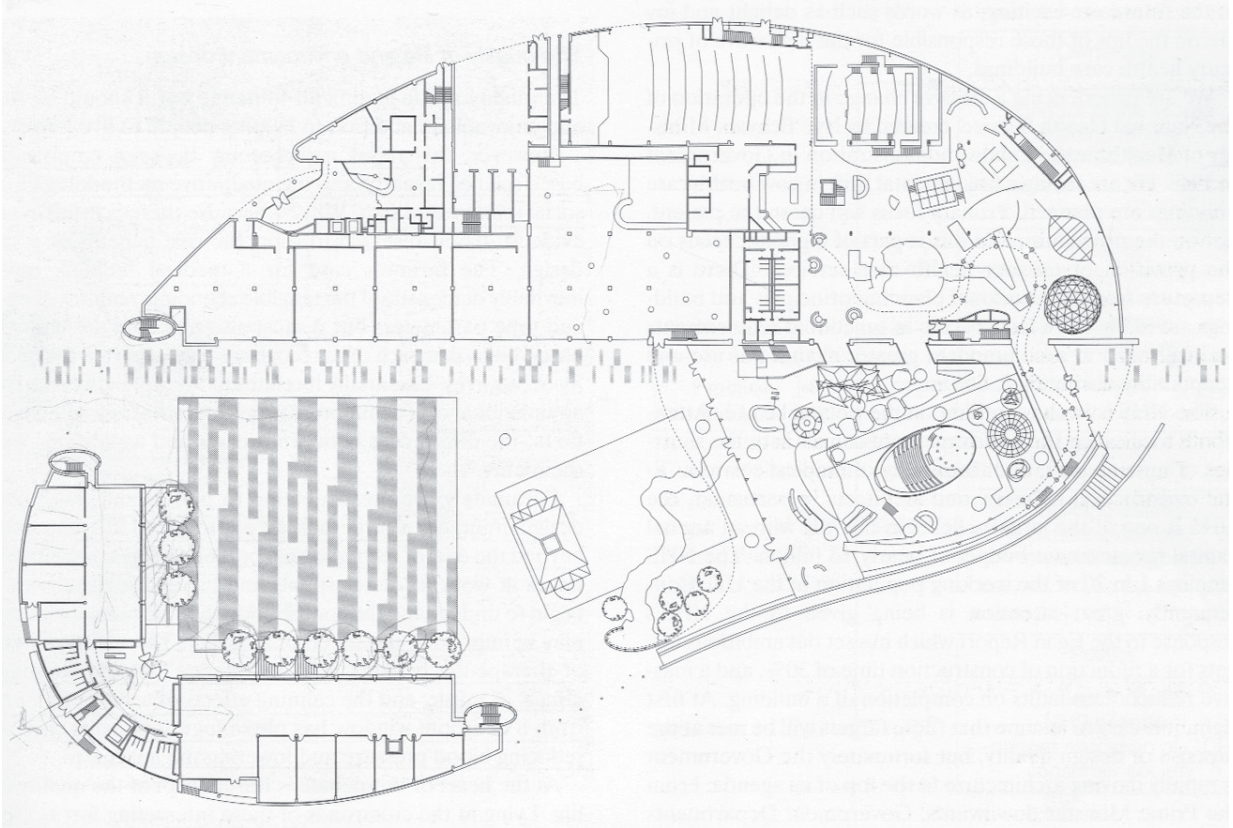
of educational and research facilities that primarily aims to educate the public specifically in the growing dependence on genetics and DNA (Purves 2002:14). The design of the centre revolves around a central public square that is dissected by a public footpath, allowing the general public to stroll in and out of the facility at their discretion. The architects also introduced various public education facilities, while the buildings are meant to “epitomise the intertwining strands between the quality of ‘place’, the sense of well-being, the natural curiosity of children and the search for knowledge” (ibid).

The architecture and innovative systems of the BMC, whether it’s a laboratory or alternative therapy spa, acts as a form of control that protects the city’s inhabitants and immune system from any crises. According to Sample (2008: 70), BMC’s architecture “is used as a prophylactic to protect individuals from contamination through the secret life of its internal environmental control systems, maintenance programs and devices”. The BMC in the contemporary biotechnical age exerts a form of power over developing cities, architecture and other constructed environments. What is clear is that the response of the BMC acts on a larger scale, where the maintenance of the individual’s health in the city is no longer perceived as singular, but is now a collective issue that can affect the whole metropolis. At the same time while BMCs focus on local testing centres, they equally focus on establishing connectivity with other BMCs across the globe that allows for research across borders.

Sample (2008:72) further emphasises the growing importance of BMCs as a city’s global identity in today’s world: a city whose local government is invested in strengthening and enforcing both the individual’s health and the city’s ‘healthy’ collective identity. Cities such as New York, Toronto and Singapore have recognised the increasing value of a BMC as both a new economic force and a mode of city organization. More importantly, BMCs are crucial to national security and are forging new identities and images from cultural centres, to ‘healthy’ BMCs.

While the concept of a BMC is spreading across the globe, certain critics argue that the very nature of a BMC ignores and filters the realities of the city including its density, polluted air and constant human interaction (ibid). However, it may be too early to understand the power of a BMC which represents a form of minimizing the urban and architectural failures of the past modern movement.





< **International Centre of Life**
Newcastle, UK.
Terry Farrell and Partners

The relatively new centre directly engages with its context and community. A public square hosts numerous talks and exhibitions, while interactive workshops educate the public on growing genetic research and forms of treatment.

Clockwise from top left: exterior view of the building and a public talk in the square (www.terryfarrell.co.uk), aerial view of the centre with a central public square and ground floor plan (Purves 2002: 15).

‘Transgenetic Transfusions’

Exploring the hybrid and its connections

Contemporary confidence in a possible mutation- or hybridisation- of the architectural object in new structures of coupling, mixture or dissolution is essential for understanding the current research into the ‘nature’ of the project itself. Today it is, in effect, a question of working with non-predetermined codes for generating examples, new dispositions and new local responses, fusing, contingently and weightedly, bits of information and codes (whether architecture, infrastructures and landscape) into new specimens. Awareness of the current and generalised coexistence alongside situations of tension, mixture, simultaneity and disharmony, is a feature not only of the social and cultural fabric, but also of the urban fabric within which the current project is framed (MDAA 2003. Sv “Transgenetic transfusions”).

The built environment’s power is often understood in its settings and institutions that can both control and direct social interactions in the everyday (Cruz & Gage 2009). The city has continuously transformed itself according to new ideas and systems, from places of great civic connection in the early nineteenth century, to a Modern city that was controlled and shaped by the mass production and consumption of cars in the early twentieth century. The later represents a move towards a “city functional” (Ellin 2006:18) that primarily revolved around vehicular movement which ultimately led to a disintegrated city that lacked multifunctional places, quality public spaces, any local character (ibid) and a general lack of connectivity with its inhabitants.

Contemporary urban design and architecture recognises this but the challenge is to enforce and induce an inner connectivity while introducing new technological and information infrastructures (both invisible and visible) within the existing urban fabric. This is essential as both buildings and cities grow and transform due to the fusion that takes place between existing architectures and new technologies (including biotechnology), which animate space through new programmes and form (Hwang 2009: 2).

Van Berkel and Bos (2002:70) suggest that architecture is no longer about sheltering but is increasingly focused on the fusion and representation that is currently taking place between the virtual and physical constructions. It is this fusion that generates new forms of structures (often unrelated to conventional typologies) that involve various programmes, people and activities. These new forms are able to sustain themselves through an established connectivity to its context and the public, which van Berkel and Bos refer to as a “public construction” (ibid). This inevitably leads to an abandonment of traditional vertical organization in favour of site-specific urban conditions and an urban envelope that is “conceived as a public landscape in which public and private, surface and volume, circulation and construction are integrated and continuous in one system” (van Berkel & Bos 2002: 71).

In her book *Integral Urbanism* Nan Ellin (Ibid) suggests that the city can be redeveloped and integrated with its inhabitants through various elements, including hybridity and connectivity. Contemporary architects emphasise the importance of the hybrid as rethinking and redefining traditional architectural typologies that are outdated and redundant in the world today. These hybrid forms and new typologies are products of a careful fusion and linking between certain forms and programmes that together are able to successful sustain themselves according to our contemporary needs and context.

These new products also offer a variety in function and form and have the capacity to connect people and activities at various points in the city, specifically along thresholds and in the peripheries of buildings. Cruz & Gage (2009) suggest that the character of these peripheries due to their programmatic variety could be argued as places that are “rather ‘sociopetal’ promoting individual engagement and social interaction in the liminal [edge/threshold] substance of architecture.” The hybrid within the contemporary city illustrates what the modern city had ignored: that the optimization of multiple variables is far greater, healthier and to the benefit of the public than the optimization of one variable (ibid). Essentially it is these hybrid forms that will create and enhance a new connectivity and interaction between new research facilities and the public, resulting in an appropriate public interface.

Architects such as Steven Holl and Rem Koolhaas continue to assert that the post modern city's vital connective ingredient is composed of the idea of hybridity. However, the hybrid doesn't only depend on a combination of architectural forms and space but also on the intensification and mixture of often contradictory forces and programmes that ensure a rich and wide variety of use by the general public, resulting in urban places of great vitality. Contemporary patterns of these programmatic hybrids include the integration of housing above retail and work spaces, office buildings with sports facilities, community-education centres with retail etc. (Ellin 2006:21).

On an urban scale, these hybrid typologies can effectively bring people together; increasing densification in the city where it is needed while revitalizing certain derelict public spaces in the post modern city and generating new gathering spaces. This inevitably infuses an integration of people with their immediate context and opens up new forms and spaces of interaction and discussion, all of which are crucial for the introduction and survival of new technology infrastructures.

OMA's Seattle Public Library is an example of the traditional library model adopting a programmatic hybrid in order to remain a leader in resource efficiency, and to offer a quality public space that extends beyond the conventional architectural prototype of a place of books. The library features art exhibition spaces, a large internet room, multimedia stores, performance spaces and many more that engage with the community and transform the library into a social centre with a mix of programmes that surround the core function of a library (Ferre 2004: 3). Since its opening in 2004, the building has successfully catalysed urban activity and public life in the downtown context of Seattle, illustrating the strength of both a structural (form) and programmatic hybrid.

The exploration of new hybrid typologies, or variations on traditional ones, is relevant and crucial when considering new facilities such as biobanks, which primarily depend and survive on an engagement and interaction with its local context and community. If a biobank is to establish any form of engagement and trust with a community, then appropriate spaces and programmes that are understood by the people must be fused with advanced research spaces and technologies. These may even consist of simple elements such as a pharmacy or even a small convenience store. In essence new technology infrastructures must adapt and transfuse with their local context and community through appropriate programmes, more so than the existing context and community adapting to them.

"The fundamental role of the architect is actually that of the typographer, associating between [contemporary] discourse and form" Mark Wigley (Wigley cited in Berkel & Bos 2002: 122-23).

> **Seattle Public Library**
Seattle, U.S.
OMA

The library is an example of a traditional archetype that has adapted and transformed to meet contemporary needs, through a programmatic hybrid.

Below is the conceptual programmatic section illustrating and emphasising the hybrid.

(Ferre 2004)

Exploring the Porous Edge

"Porosity preserves the integrity of that which is brought together while allowing mutual access through permeable membranes, rather that the modernist attempt to dismantle boundaries or postmodernist fortification." (Ellin 2006:6).

The greatest challenge that a contemporary architect faces in introducing a biobank, specifically in an existing urban context and community such as Hillbrow, is to make it accessible on both a physical and ideological level. Architects should ensure that their design enables both the individual and general community to freely, and more importantly, comfortably engage and respond with the facility.

Over the last few years there has been an evident shift in design approach, from the modern dogma of the 'machine for living in' to a contemporary attitude that seeks a connection between the constructed environment and new information technologies (including the internet and biotechnical age). Nan Ellin suggests that there is also a growing approach to treating the boundary, edge and in-between as both concepts and as actual places of activity (2006: 2) rather than stagnant spaces.

The edge no longer represents a point of separation or a place where one thing comes to an end. Instead it can now be perceived as an intense space of excitement and synergy (ibid) where one condition leads to another. The edge must now be considered and treated as a form of threshold where two systems can meet, fusing and thriving on each other. The redefined edge becomes a threshold where the individual is led from one to the other: the other world, values and beliefs. This new attitude to the edge must be explored and developed further when implementing the biobank, in order to infuse a vital connection with its local community and context.

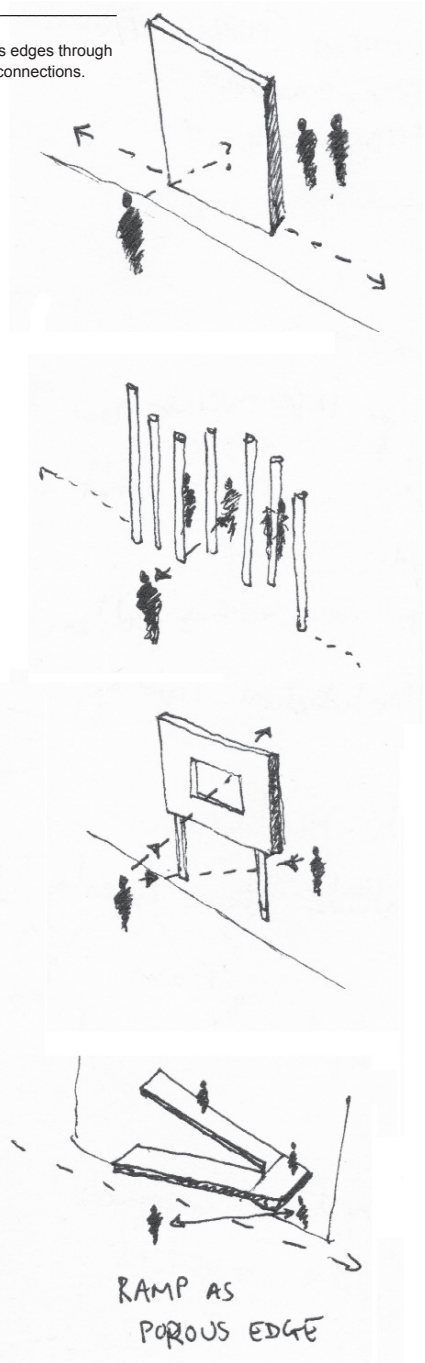
"A boundary is not that at which something stops but… [it] is that from which something begins its essential unfolding. That is why the concept is that of 'horismos', that is, the horizon, the boundary" Martin Heidegger in Ellin (2006:88).

Although post modern tendencies of creating physical barriers through large, inexpressive walls was a direct result of establishing control within traditional solitary environments, this approach must be used cautiously when designing contemporary research facilities. It is this pragmatic and well-intentioned edge treatment of the modern movement which Ellin acknowledges as a way to "cleanse the city of illness" (2006:7), but she also argues that is has also caused a serious disruption in connectivity and energies within the city.

While it is impossible to address all fortified edge conditions that restrict connectivity and growth in the city, some can and should be reinterpreted and engaged with as spaces that encourage activity, interaction and communication between two distinct systems and environments. The edge or border can be reinterpreted as an important space for symbiosis to occur. Ellin further emphasises the idea of puncturing through these barriers within the city in order to achieve a flow of people, information, resources and ideas (ibid). This is commonly referred to as 'Urban Acupuncture' that breaks down urban blockages and catalyses a possible connection between communities and new systems. This may be undertaken in various forms, dependant on the context, ranging from vital activity hubs to quality open green spaces within the city. This mode of action should be practiced when implementing new technologies and buildings, specifically due to the extreme densities of people and congested spaces within central Johannesburg.

In architecture, it is traditionally the primary element of the wall that defines the edge/boundary and its nature defines the type of porosity achieved. The modern spirit treated the wall in a socially, politically and functionally relegated manner to being merely a space divider and organiser, inevitably being perceived as an unusable surface (Cruz & Gage 2009). However, contemporary beliefs view these surfaces as the 'inhabitable' and suggests the possibility of them being inhabited by both the individual and their immediate environment. By rethinking the nature of the wall, as a habitable surface of built-in furniture or as a media display surface or even ornamentally rich with alcoves and niches, it rethinks the idea of edge as an extended boundary which is a catalyst of both individual and collective activity that engages with the surrounding environment (Ibid).

Contemporary architecture is beginning to explore not only wall surfaces but also a merging of wall surfaces with other surfaces of floors and roofs into continuous and porous membranes. This often leads to interesting and dynamic spaces within a building and also suggests a dispersing of the edge, blurring the lines between functions and forms, interior and exterior, public and private. An urban porosity and connectivity can also be achieved through the application of these permeable membranes to separate and unite buildings from and



> Exploring porous edges through openings and visual connections.

(Author's own)

within their cultural and physical environments (Ellin 2006:77). The edge should no longer be perceived and designed as a boundary but as a new form of threshold.

There are various forms of achieving porosity in a building and within the city. A major form of porosity is visual porosity, which is commonly achieved through the use of glass to display the interior activities and spaces of a building to the exterior street but doesn't allow one to move through a space. This form of porosity enables a visual connectivity between people and their built surroundings, while lending vitality within the city (Ellin 2006:63). Visual porosity may also only allow partial visibility into a space, through filtering devices such as screens and landscaping. Architects such as Herzog and de Meuron, are continuously exploring and treating the physical boundary of buildings as "porous membranes between public and private spaces" through metallic screens and translucent glass (Ellin referring to Muschamp 2006:65).

Functional porosity refers to the direct physical access to a place and defines our relationship with it. This is the inverse of visual porosity, as functional porosity permits access and movement through a space but provides privacy through visual opacity (Ellin 2006: 70). This form of porosity on an urban scale can contribute to the nature and quality of a space and defines its public or private nature. This type of porosity is often achieved through building edges that are permeable, using elements such as porticos, arcades, windows and outdoor seating spaces (ibid).

Elements and concepts that illustrate porous edges/ membranes on both a building and urban scale are evident in Diller Scofidio and Renfro's renovation of the Lincoln Centre in New York City. The architects have introduced permeable membranes on the ground floor in form of transparent facades and animated display screens which visually engage with the city and its inhabitants. These have replaced previous opaque walls which literally shut out the public. Another intervention in the scheme is a transparent glass box that houses a dance studio in the Alice Tully Hall. This again allows for a visual engagement among passers-by, the dancers and the street while a new staircase provides public seating and acts as a threshold from the street to a plaza. The architects have thus been able to successfully break down previous physical barriers and have explored porous edges both spatially and programmatically that creates a connection between the centre and the city's residents.

Taking all of this into account, there therefore needs to be a rethinking and redefinition of the traditional block-like research and educational typology that is the product of the modern spirit. A more permeable facility must be developed, breaking down any barriers that are common of traditional institutional research spaces. These defensive barriers, albeit pragmatic for security measures, also enable an introverted environment within the building. While secure and private spaces are still desired within a biobank, a less defensive and more permeable approach while designing other spaces must be taken, in order to catalyze communal involvement, participation and understanding in this form of cutting edge research. A facility that has permeable edges should facilitate its transfusing and engagement with the common man, the local community and the existing urban fabric.

^ **Lincoln Centre for the Performing Arts**
New York, U.S.
Diller + Scofidio (+ Renfro)

The architects infuse visual connectivity between the building and its context (street and pedestrians) through the use of transparent materials such as glass.

(Incerti 2006)

"We are building too many walls and not enough bridges."

- Scott Carson in Ellin (2006:16)

^ **Alice Tully Hall**
New York, U.S.
Diller + Scofidio (+ Renfro)

Pedestrians are visually connected with the building and its interiors from the outside.

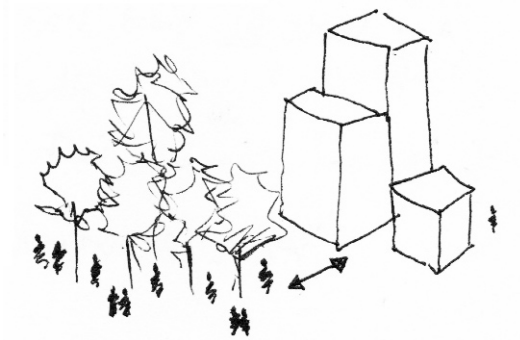
(Baan, I. [O] http://www.iwan.com)

Landscape

The biotechnical age represents a period in which man has understood and recognised the undeniable strength of nature in connection with the man-made. Such is evident in a return to exploring the natural systems of the human body and DNA, combined with advanced man-made technologies that can dismantle the spread of disease and accelerate new cures. Man has always manipulated the natural landscape through processes of moulding, cutting and extracting in a manner that has inevitably resulted in our environment being subjected into two opposing categories: the ‘natural’ and the ‘man-made’ (Allen & Manolopoulou 2009). The modern city’s blank and impermeable facades represented, if not celebrated, this opposition and the idea of nature transformed and controlled by man.

The urban fabric has therefore often been viewed as a form that rejects the natural landscape. However, contemporary architecture should not oppose but exist as a response to landscape’s inherent qualities, lines, forms and surfaces (ibid). Simultaneously, the natural landscape is a healthy force that should be exaggerated in the current urban landscape, in response to the random void spaces left by Modernism.

Moving through postmodern Johannesburg, it is clear that the city or urban fabric is at a contrast to the natural landscape or earth in specific places. Johannesburg’s ‘landscape’ should be understood as one that involves two different layers; one being the natural layer of the earth, the second being its built forms and artificial structures. Open plots of natural landscape in the city (although they are minimal) depict points of tension where the urban layer is pierced through by the natural layer. These points may suggest points of conflict: where the urban cannot entirely transform the natural due to intense variations in topography. Addressing and transforming the postmodern city with new technology infrastructures, requires an approach that considers the city’s two layers as those that are at fusion and union in certain points. Landscape and urbanity should be integrated, feeding off each other, rather than opposing or merely framing each other (Ellin 2006: 14).



It is the fusion of these two layers which Hwang (2009: 2) suggests will produce new architectural organisms, spaces and environments within the city. This fusion is also relevant when addressing ideas of porous edges as discussed earlier. Buildings, specifically urban buildings, need permeable edges that allow for a blurring of inside and outside: interiors become exteriors; cities can become gardens (Allen and Manolopoulou 2009), all generating new spaces of communal interaction and activity. Natural landscapes within the city, although best when left natural, cannot remain still. They, like urban landscapes, are dynamic and inevitably transform through forces, systems and new infrastructure occupation (ibid).

Diller + Scofidio and Renfro’s High Line in New York city illustrates an approach of infusing landscape with an existing, although ruined, piece of urban infrastructure in the form of a rail line. The architects have introduced the idea of an open park with elements of the natural landscape (planting) that begin to transform the man-made into a completely new architectural form. The ‘park’ also serves as a connective element in the city or an “instrument of leisure…which accommodates the wild, the cultivated, the intimate and the social” (Incerti 2007: 198). Diller + Scofidio and Renfro’s treatment of space as a continuous flow enables the park’s users to move freely through and engage with their city at various points along the platform. Change and transformation has been acknowledged as the inevitable and thus the park is left unfinished in certain areas to adapt and be transformed (ibid). The High Line in essence represents an architecture that exists in harmony with is surrounding environment, acknowledging both the past and future that render it self-sustaining and integrated with its context.

> **High Line Park**
New York, U.S.
Diller + Scofidio (+ Renfro)

The powers of nature in open spaces in the post-modern city are evident in this project. The city's inhabitants are offered an open, green place of leisure, away from the chaos of the city but can still visually engage with their surroundings.

Clockwise from top right (Incerti 2006), (Baan, I [O] http://www.iwan.com)

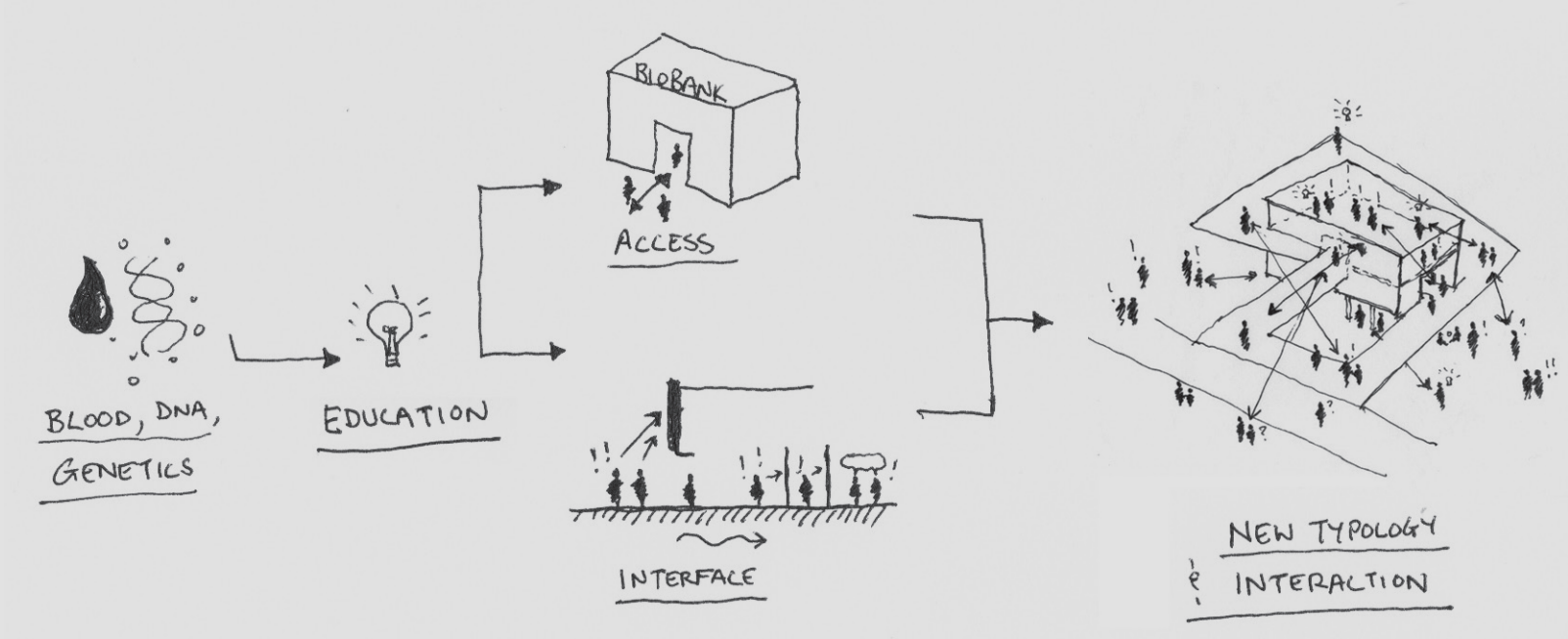
Conclusion

Through various scales and levels of enquiry, it is clear that numerous cultural, social and architectural issues and ideas need to be acknowledged and addressed as we implement new technologies into our communities and city. These have inevitably transcended into the present biotechnical age but it is our creative responses to them that can ensure the breaking down of various boundaries, enabling the biobank to comfortably establish itself within its context. Themes such as boundaries in their physical or spatial forms arise and indicate a careful consideration of public and private interfaces, programmatic hybrids and permeable edges.

As new ideas and values of the body and blood emerge in the genetic age, traditional ideas of control in various forms need to be rethought. Conventional ideas of research and their forms are now being challenged, suggesting a rethinking of typologies and spatial systems. Traditional research spaces that practiced control through introverted and defensive environments must now adapt, specifically within biobanks, in an attempt to engage and stimulate an interaction with its community. While secure and private areas are still necessary, a less defensive approach to other spaces needs to catalyse a communal understanding and participation in the early stages of this form of cutting edge research.

With new technologies, visible or invisible, adjustment and adaptation is required in various forms. Architecture is a powerful cultural tool that represents and expresses this change and eventually the new identity that emerges from a certain age. In contrast to the modern expression of precision, homogenization and universality (Jan Henket & Heynen 2002: 258), new expressions are beginning to appear that specifically relate to the “consciousness, collective intelligence and co-existence” (Ferre 2004: 199) in the information and biotechnical age.

The proposed biobank in the inner city area of Hillbrow should reflect these new forms of expression in both its physical and spatial forms. A new research typology should be discovered and explored through the integration and juxtaposition of various public-educational programmes with private research facilities. Such a typology should therefore transcend the function of research with spatial systems and programmes of information and discoveries that will enhance the community’s experience and engineer their awareness to the emerging dependence of genetic-based research and treatment. The desired end product should be an architecture that illustrates a transfusion with the common man, the community and existing urban fabric.

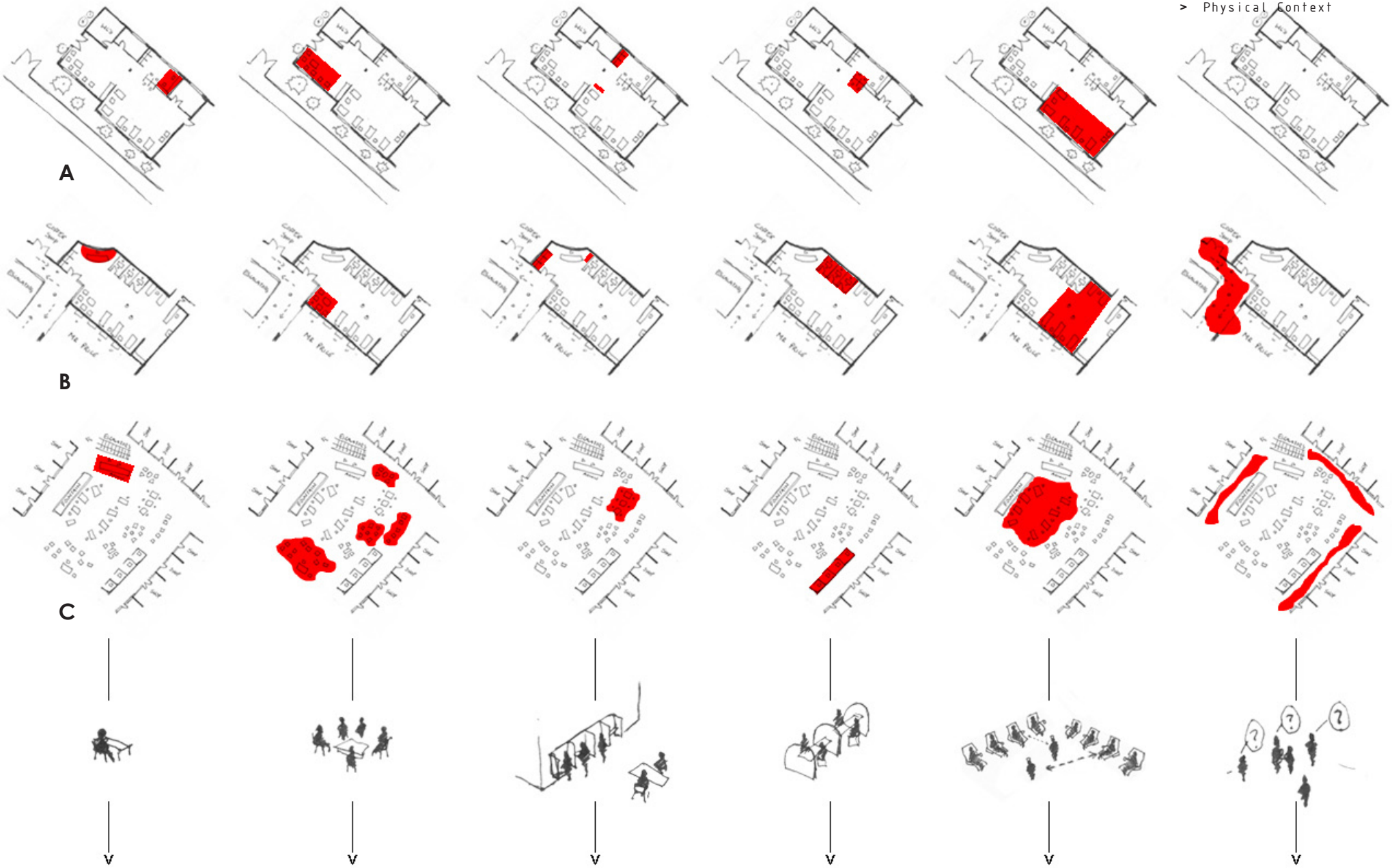

BLOBANK
ACCESS
BLOOD, DNA,
GENETICS
EDUCATION
INTERFACE
NEW TYPOLOGY
INTERACTION

Visual Analysis

In the beginning of the year, an *experimental* exercise was undertaken in the observation and analysis of certain blood centres and blood drives around Johannesburg. This was particularly done to establish some link between blood and 'public' space: the nature of space where such a stigmatised subject was 'publicly' acceptable. A comparison among three centres was made to understand shared zones and both public and private interfaces. While the overall exercise proved to be futile in many ways, one outcome that was derived were the elements of consumption and leisure. Interviews with numerous blood drive assistants, nurses and voluntary donors suggested that the public felt more comfortable to donate and speak about blood in non-clinical atmospheres. Blood drives near shops and cafes attracted more people than stand-alone blood centres. This element of leisure and consumption as a programmatic interface was kept in mind as the thesis developed in its early stages.

> **Blood and Space Study**

The three case studies and the identified common zones: Auckland Park Blood Centre, Johannesburg (A), North Gate 'blood' shop, Johannesburg (B), general blood drive in shopping mall (C).


A
B
C
Admin.
Leisure/lounge
Questioning
&
Testing
Private
"one on one"
Donation
Public "feed" space=
places of consumption and
leisure

Physical Context

Design Brief

"Engineering the Public Construction [new public-orientated architecture] gives rise to a range of different forms, all unrelated to conventional architectural typologies."

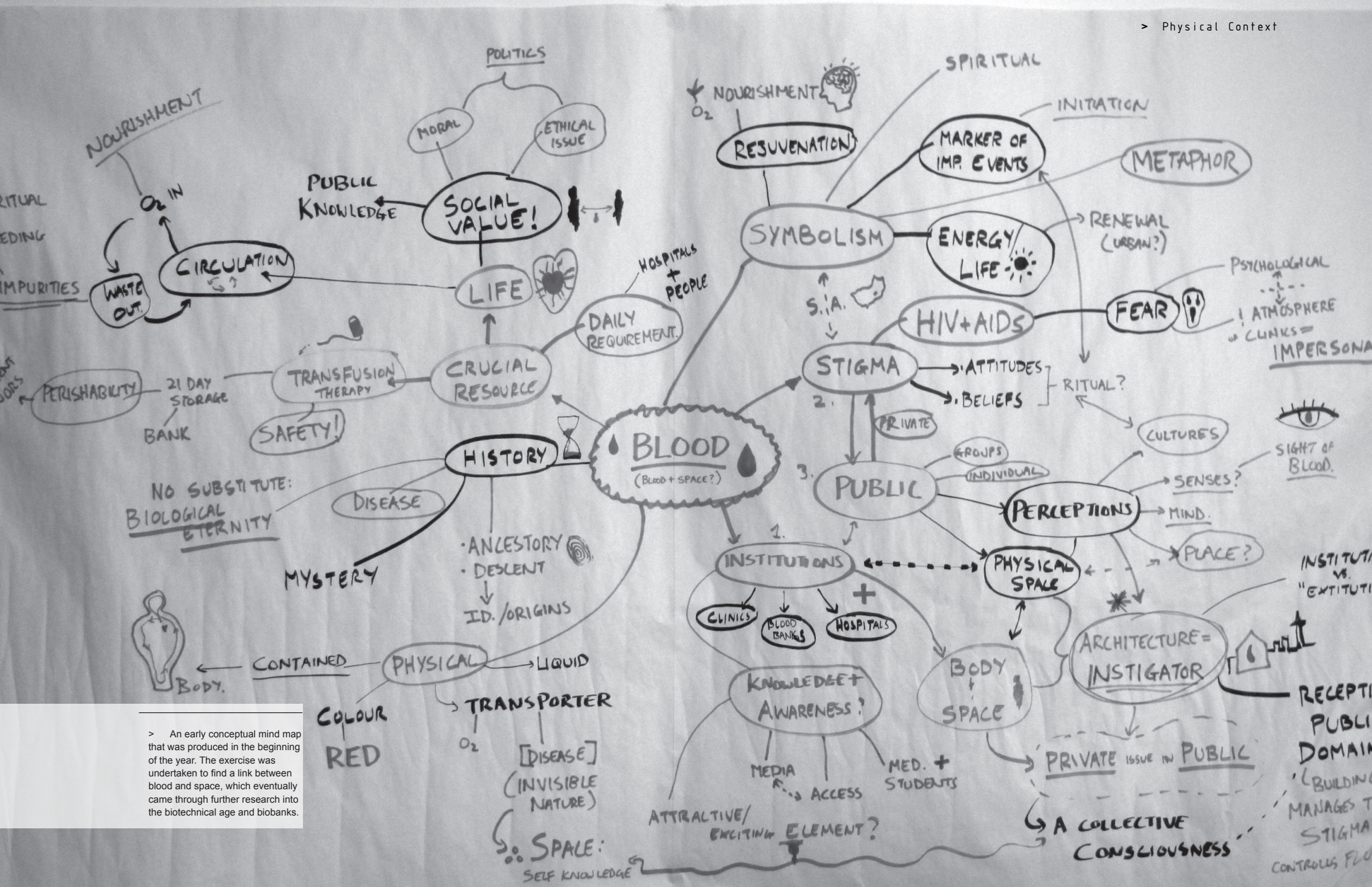
(Van Berkel & Bos 2002:71)

As modern technology progresses, our immediate environments are being physically transformed with the introduction of new, high end technologies and research infrastructures such as the biobank. The survival of these however, is dependant on establishing a critical connection with local contexts and communities. Such connections have successful been formed in developed countries, through people's general awareness and acceptance of what these technologies mean for them, their families and the general population. As a result, voluntary public interaction and cutting-edge research has commenced, with pivotal medical discoveries being developed and applied back into the public realm.

The same results however, cannot be easily achieved when introducing a biobank in contexts such as Hillbrow, Johannesburg. This is largely due to the prevalence of a life long embedded stigma and negative perceptions behind the primary research resource which the biobank needs: blood deposits. Inevitably a tension will occur between the new, high end technology infrastructure and the local Hillbrow community.

Addressing the community's suspicions, fears and needs has to be immediately pursued and emphasised through appropriate educational interfaces, systems and environments. As such a new research typology needs to be explored; this will correspond directly with the community and will break down any boundaries that may arise. Inducing an engagement has to begin with *understanding* the community and their local context on various levels. Investigating existing interfaces within Hillbrow, both physical and programmatic, should highlight what the community is comfortable with and understands. These can then be considered and applied to the development of a start-up Hillbrow Biobank, which will develop even further over time.

The Hillbrow Biobank should be an example of a new research typology that offers free services and acknowledges voluntary public participation through means of access, permeability and the basic idea of ownership. New research outcomes and developments from the facility's private biomedical laboratories, should be shared with the community and accessible to the common man. A combination of a programmatic hybrid, as a suitable public interface, with new spatial environments should engineer and stimulate the community's awareness to the emerging dependence of genetic-based research and treatment. This should also stimulate their imagination, faith and participation in this new form of research, simultaneously encouraging researchers to urgently explore alternatives and unravel the mysteries of various diseases.



> An early conceptual mind map that was produced in the beginning of the year. The exercise was undertaken to find a link between blood and space, which eventually came through further research into the biotechnical age and biobanks.

Physical Context

Hillbrow

"...the city has become a honey pot for a new kind of Africa, drawing in-migrants, legal and otherwise, from all over the continent...in addition however, it has to deal with the prospect of a tragic drop in population, caused by the appalling morality of HIV and other diseases..."

On Johannesburg in The Endless City (Sudjic 2007:200-1)

Approximately one kilometre from what was the central business district of Johannesburg, lays one of South Africa's most dense urban districts: Hillbrow. This high-rise, inner-city neighbourhood is home to thousands of locals and an ever increasing number of foreigners including Nigerians and Congolese. While the area has obtained a dubious and cutting-edge reputation, it is a landscape that represents the extremes of urban life and conditions: congested living spaces, the prevalence of poverty & unemployment and a highly infected population. Conditions which contemporary, cutting-edge research thrives on.

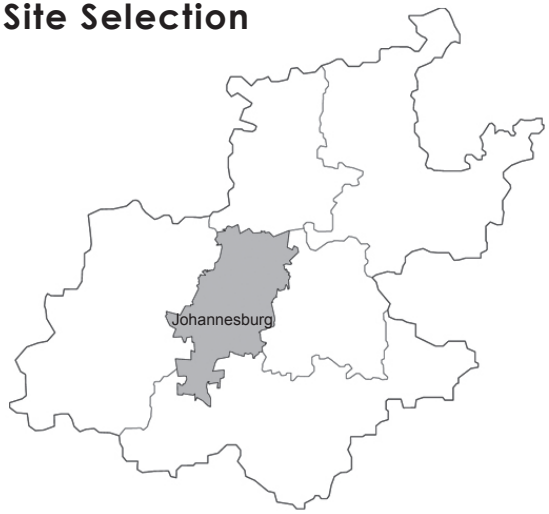
The area is also a host to a relatively new Hillbrow Health Precinct (HHP) initiative that is aimed to support both the local community and general city population through advanced forms of medical care, education and research. The HHP's relative success has been attributed to its understanding of local community needs, as well to its constant evolution through adopting and adapting to new technology systems and infrastructures of research, treatment and education.

^ Taken from the Telkom Tower. This image depicts the extremely dense urban conditions of inner Hillbrow: high-rise residential buildings that are overcrowded and often poorly maintained. These conditions also aid in the spread of numerous diseases such as TB within the area.

Image courtesy of Leon Krige (2011)

> Within the HHP, community support and health- education classes are undertaken in extremely tight rooms that ensure privacy but lack visual appeal. However, this program of 'open' discussion has been effective in educating the community on general health issues and the introduction of new forms of treatments and research.

Site Selection



> Gauteng Province

> Johannesburg and CBD (shaded)

> The HHP within its greater context

1. The Hillbrow Health Precinct
2. Park Station
3. Park Station Taxi Rank
4. Joubert Park
5. Community Centre
6. Hillbrow (residential area)
7. Constitution Hill
8. Metro Centre (Braamfontein)
9. Rissik Street

Site Selection

De Korte St, quadrant three of HHP,

Hillbrow

The HHP is located in the heart of Hillbrow, bordering Braamfontein and is immediately adjacent to key precincts such as Constitution Hill to the north and Park Station to the south. The precinct itself is composed of four quadrants, bounded by Kotze and Rissik Streets to the north, Joubert Street to the west, Smit Street to the south and Klein Street to the east. These quadrants consist of various educational and medical facilities; clinics, research laboratories and housing.

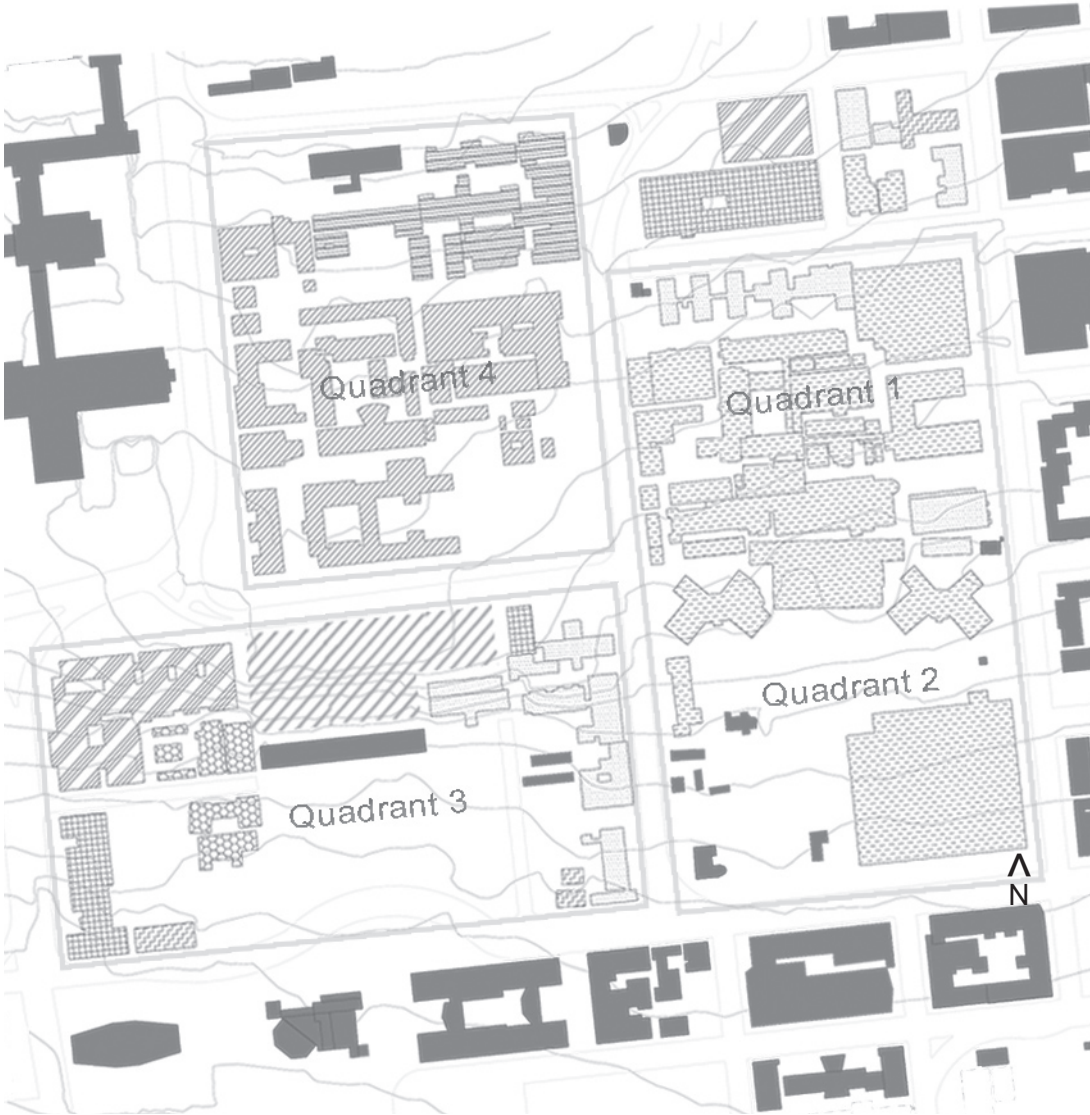
The proposed site for the Hillbrow Biobank is located in the third quadrant and is currently being used as an open car park for visitors and staff of the National Health Laboratory Service that sits directly opposite the site. The open nature and naturally steep topography of the site, represents a physical and symbolic point of tension in the urban fabric; a space unable to be transformed by the modern city, rendering it 'unusable' and void.

The placement of the Hillbrow Biobank in this space will revitalize the site and infuse it with new use that will enable inter-connectivity within the precinct, community and greater context. Pragmatically, the Hillbrow Biobank is strategically placed within the HHP where it will be secure and eventually correspond with existing facilities and clinics through an exchange of new information, crucial discoveries and treatments.

> The HHP's quadrants and general uses

- Medical research/ labs
- Medical services/ clinics
- Residential
- Student accommodation/ training
- Social/ community use
- Tertiary education
- Commercial (shops)
- JHB Mortuary

Information obtained from site visits and HHP Development Frameworks (GAPP Architects & Urban Planners 2004) and (Ludwig Hansen Architects & Urban Designers 2011).



> The HHP and key features

1. Esselin Clinic: RHRU's 'Centre of Excellence'

2. RHRU/ NGO main reception & headquarters

3. Hillbrow Community Health Clinic

4. Hospital Street

5. Future development: Johannesburg Technical College

6. Existing heritage building

7. National Health Laboratory Service (NHLS)

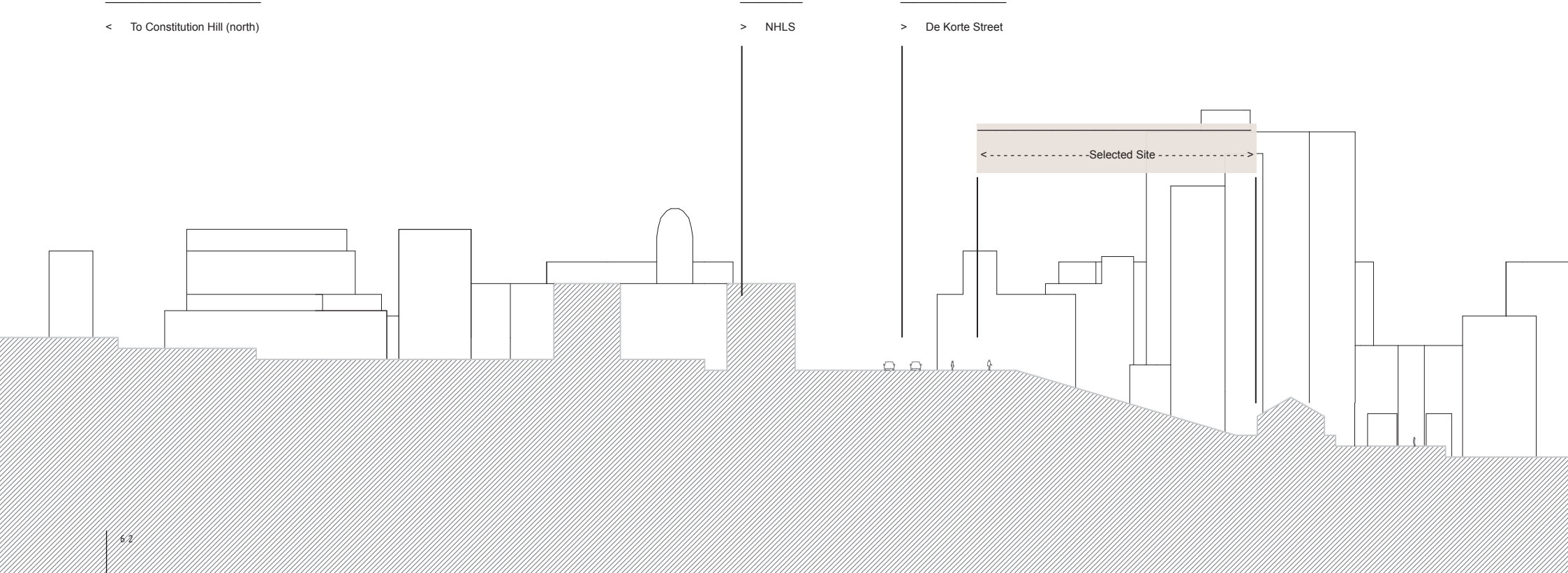
8. De Korte Street

9. Proposed site of the Hillbrow Biobank with regards to the future development framework of the HHP

Information obtained from site visits and HHP Development Frameworks (GAPP Architects & Urban Planners 2004) and (Ludwig Hansen Architects & Urban Designers 2011).

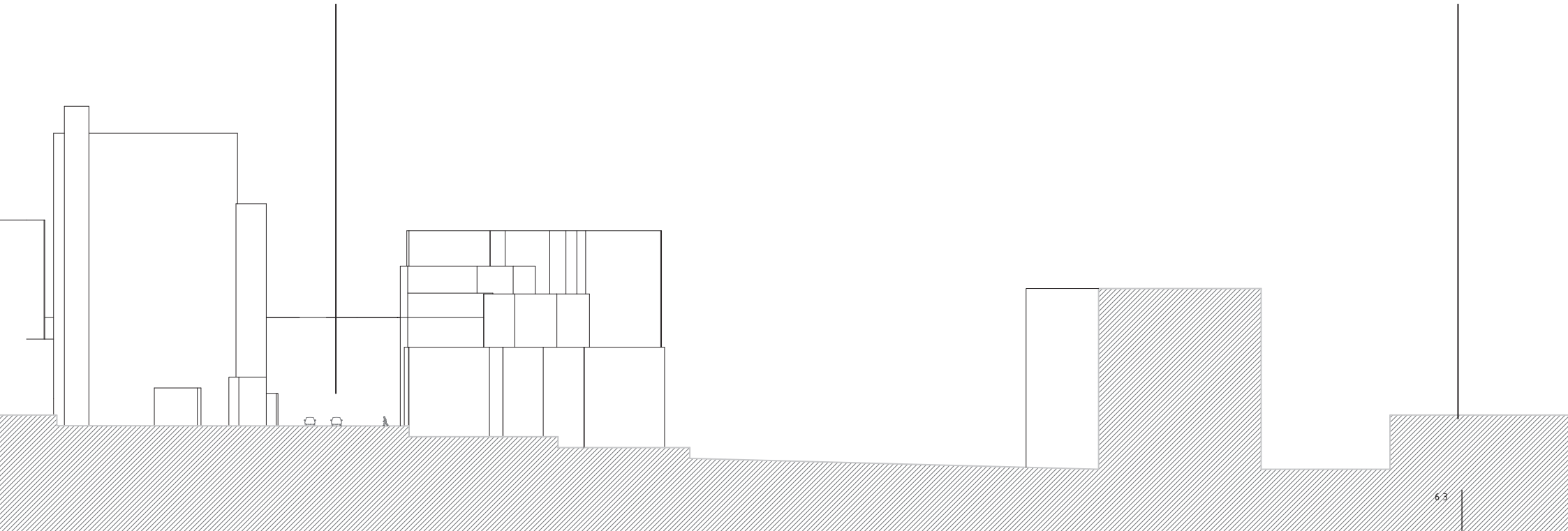
General Transverse Section

Across site and quadrant three
(1:1000)



> Smit Street

> Park Station (south)



^ View of the proposed site in the foreground on the right. Behind it is an extraordinary view of the southern part of the city. In the foreground to the left of the picture is the NHLS's rooftop and turret. The view is captured from the rooftop of one of quadrant four's buildings.

Transformations

The beginnings of Hillbrow can be dated back to the development of Johannesburg into a metropolis in the 1930s. While the area today has obtained a dubious and poor reputation by many South Africans due to the prevalence of crime, prostitution and drugs, it was in fact one of the most sought-after and posh suburbs within the city. Morris (1999: 6) highlights that at the very beginning of Hillbrow's development, the area was often advertised in local newspapers as "The Healthiest and most fashionable suburb of Johannesburg...within two minutes of Hospital Hill."

It was this fashionable reputation which saw the influx on numerous white locals and foreigners, turning Hillbrow into a predominately all-white area. However by the 1960s a transition began to occur within the city which saw an influx of black and coloured people into various parts of the city (Morris 1999: 7). With this racial transition, many whites started to vacate Hillbrow specifically due to an increase in population, crime and ongoing racial tensions. By the 1990s Hillbrow became an area dominated by foreign Africans and almost instantly gained a negative perception from outsiders. With the racial transition of the area, came a reasonable amount of physical neglect and decline (ibid) that contributed to the prevalence and spread of various diseases. Tensions based on ethnicity and blood lines are also rife within the area. Hillbrow today is a preface to the inner city of Johannesburg: an urban fusion of diverse cultures, lifestyles and heredities.

> Continuously transforming: Hillbrow is host to both a decaying urban fabric and a constant influx of migrants from all over Africa.


CAPITEC
Bank
REFURBISHMENT
OF THE ELKAM BUILDING
TOUCH MUS
MEDICAL&DENTAL
CENTRE
Sona Available
39 Pretoria Street.
• STUDIOS • BACHELORS
• 1 BEDROOM • 2 BEDROOM

Public Health Protected

Although contemporary, postmodern Johannesburg is consistently challenged by the crisis of disease spread and its negative and social impacts on the population, ironically it has had a history of being in the global forefront of medical research. With the aid of a relatively well developed preventative health city infrastructure in the early 1900s, medical research achievements were produced within the then South African Institute for Medical Research (SAIMR) (Rudolph 1986: 157), now known as the NHLS.

The SAIMR, founded in 1912 but preconceived in the early mining days of Johannesburg, gained a reputation of becoming one of the world's pioneers in medical research. It is believed that the SAIMR was the vision of the ambitious Sir Percy Fitzpatrick who often campaigned for a 'bacteriological institute' in transforming Johannesburg and protecting its citizens from various diseases, towards the end of the 19th century (ibid). After numerous failed accounts of developing the SAIMR, an alarming 'public' health crisis in the spread of various diseases (particularly pneumonia) among black mineworkers brought the city into action and ensured the implementation of Fitzpatrick's vision. Sir Herbert Baker was commissioned to design SAIMR's buildings on an open piece of land adjacent to the then Johannesburg General Hospital (now quadrants one and two of the HHP) and construction began in 1913 in the quest to battle inner-city disease.

Through various forms of intense research, the SAIMR eventually developed new forms of vaccines that controlled the crises of the "disastrously high" (Rudolph 1986: 159) death rate from pneumonia among the miners and focus shifted to other public epidemics and diseases such as malaria. The SAIMR had also been a key player in dealing with other epidemics in southern Africa. Baker's design inevitably became the city's visual icon of cutting edge research and a physical, yet symbolic manifestation of discovery, knowledge and hope for its citizens.

< Aerial view of the SAIMR (now NHLS) laboratory and administrative complex in 1980. The image depicts a complex that was once 'open' to the public but has since seen the introduction of various physical boundaries and fences.
(Rudolph 1986: 160)

< One of the many laboratories of the SAIMR in 1926. The laboratories since then have been updated to meet contemporary standards. The facility, now know as the NHLS, is still active in research but has done little to engage with its local community.
(Rudolph 1986: 158)

> The NHLS as it stands today, viewed from De Korte Street. In an on-site interview process conducted by the author, many locals indicated that they had no connection to the building. To many the NHLS is a mystery, that is inaccessible and makes no attempt to visually or functionally engage directly with its local community.

Towards a 'BioMed' City

Hillbrow Health Precinct and RHRU

With the transition of the inner city and Hillbrow came an unprecedented form of urban decay characterised by deteriorating infrastructure, overcrowding, unemployment and a burgeoning epidemic of diseases including TB and HIV. While the NHLS, formerly the SAIMR, is still active in ongoing research and development, it has evidently done little to positively adapt to the city's transition and transformation. This supposedly 'publicly accessible' building (according to the NHLS website) instead has created new physical barriers such as fencing and security points, in response to security concerns. Inevitably, this has physically shut out the public and prevents any form of interaction and exchange, turning this once civic icon of hope into an ivory tower, only to be admired from the outside.

However, in response to the inner-city's transformation and the recognition of the importance of contextual and communal engagement, a joint venture by the government and University of the Witwatersrand[1] was undertaken in 2002 in the transformation of the defunct Hillbrow Hospital into a Health Precinct. This precinct represents a strategic form of intervention through the establishment of multidisciplinary (communal and medical) services and facilities including clinical, education, research and training that are aimed to support the local community. The HHP's vision of creating a 'world class' centre of health in the inner city (http://www.jda.org.za/news-and-media-releases-2011/february/650-hillbrow-health-precinct-is-born) that offers contemporary services and infrastructures therefore renders itself as adaptable to new systems of education and research. Perhaps this could be viewed in light on the recent global 'BioMed City' trend; the early stages of transforming Johannesburg and transfusing it with vital new public health infrastructures.

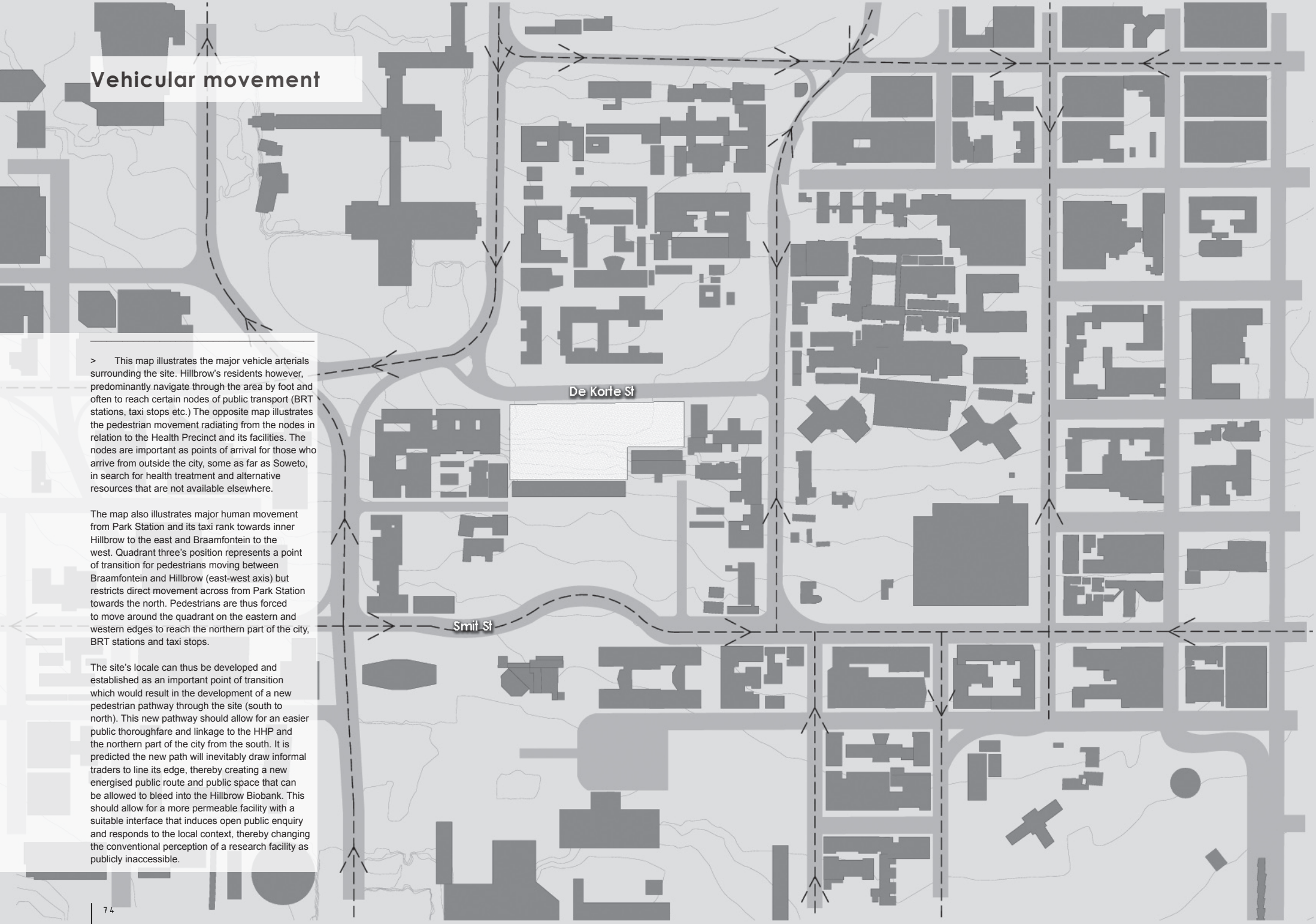
"The RHRU has a long-standing commitment to work with the inner city community around the provision of health services and issues of transformation. We recognise that partnerships of this nature are crucial to addressing the long-term challenges we face as a country." - Eugene Sickle, Head of RHRU Strategy and Development (http://www.jda.org.za/news-and-media-releases-2011/february/650-hillbrow-health-precinct-is-born)

The initiative also recognises the importance of the good quality spaces and urban renewal in strategies to combat disease spread and for the effective implementation of new technology services and infrastructures. It has effectively pushed for alterations to existing buildings, new open public spaces, green areas and new pedestrian pathways throughout the precinct that allows for an easy flow and connectivity within the city. These interventions are important forms of public interfaces to the facilities and should induce greater community interaction within the precinct. Complimentary to these are the relatively successful programmes that induce community engagement, participation and education and will be discussed later.

1 The initiative is operated at ground level by the university's Reproductive Health and HIV Research Unit (RHRU).

Site Analysis

Vehicular movement

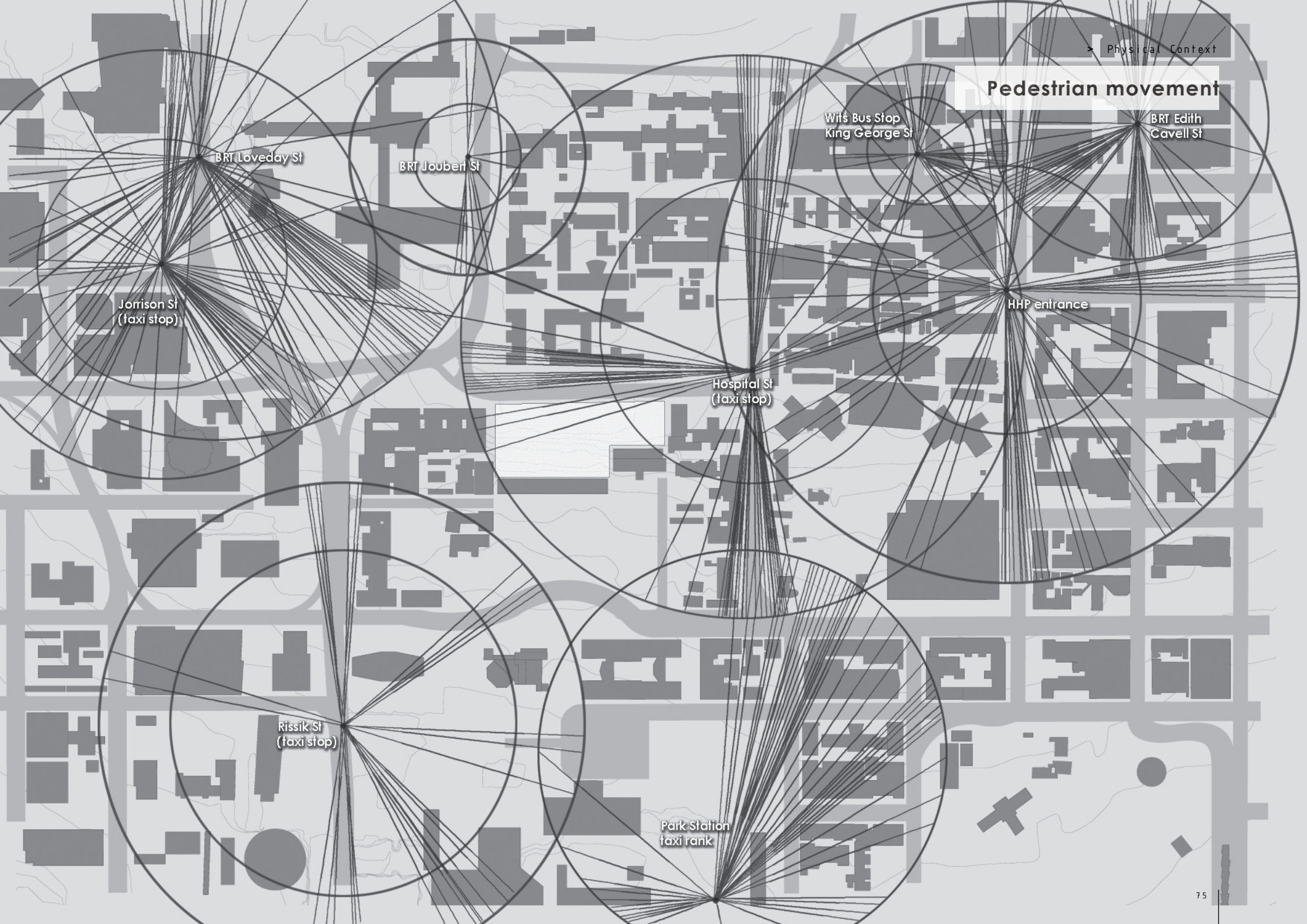


> This map illustrates the major vehicle arterials surrounding the site. Hillbrow's residents however, predominantly navigate through the area by foot and often to reach certain nodes of public transport (BRT stations, taxi stops etc.) The opposite map illustrates the pedestrian movement radiating from the nodes in relation to the Health Precinct and its facilities. The nodes are important as points of arrival for those who arrive from outside the city, some as far as Soweto, in search for health treatment and alternative resources that are not available elsewhere.

The map also illustrates major human movement from Park Station and its taxi rank towards inner Hillbrow to the east and Braamfontein to the west. Quadrant three's position represents a point of transition for pedestrians moving between Braamfontein and Hillbrow (east-west axis) but restricts direct movement across from Park Station towards the north. Pedestrians are thus forced to move around the quadrant on the eastern and western edges to reach the northern part of the city, BRT stations and taxi stops.

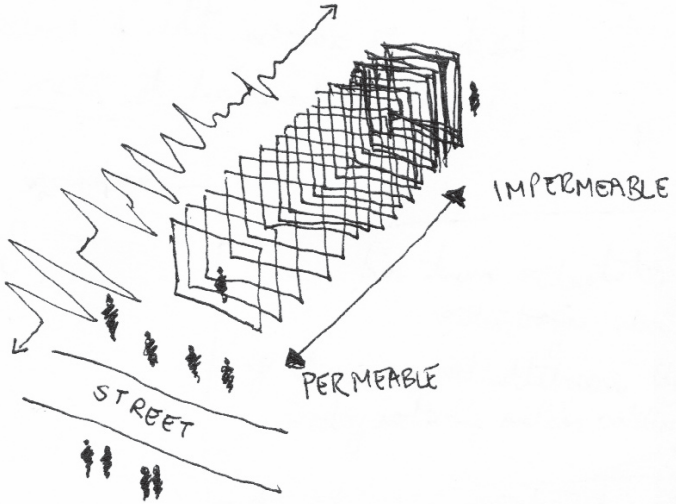
The site's locale can thus be developed and established as an important point of transition which would result in the development of a new pedestrian pathway through the site (south to north). This new pathway should allow for an easier public thoroughfare and linkage to the HHP and the northern part of the city from the south. It is predicted the new path will inevitably draw informal traders to line its edge, thereby creating a new energised public route and public space that can be allowed to bleed into the Hillbrow Biobank. This should allow for a more permeable facility with a suitable interface that induces open public enquiry and responds to the local context, thereby changing the conventional perception of a research facility as publicly inaccessible.

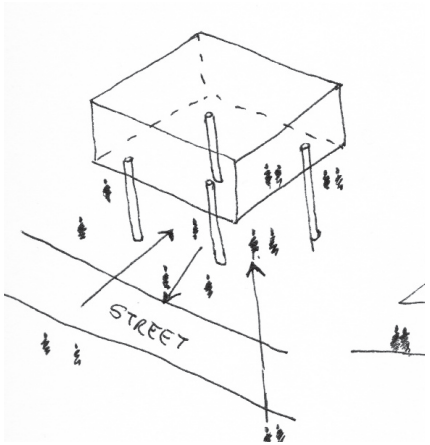
Pedestrian movement

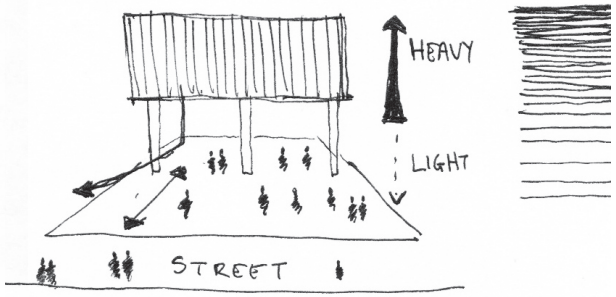


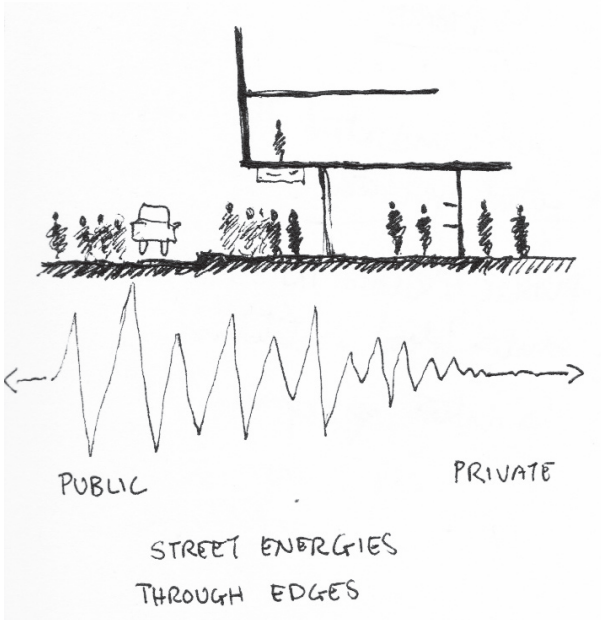
Hillbrow's Edges

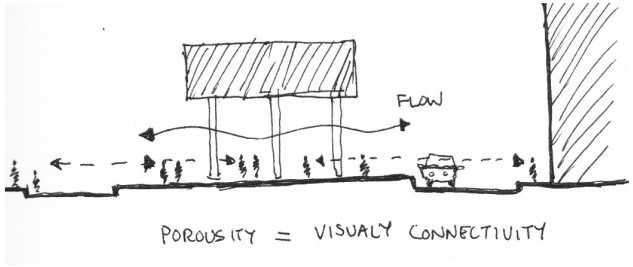
Analysing the DNA of its boundaries





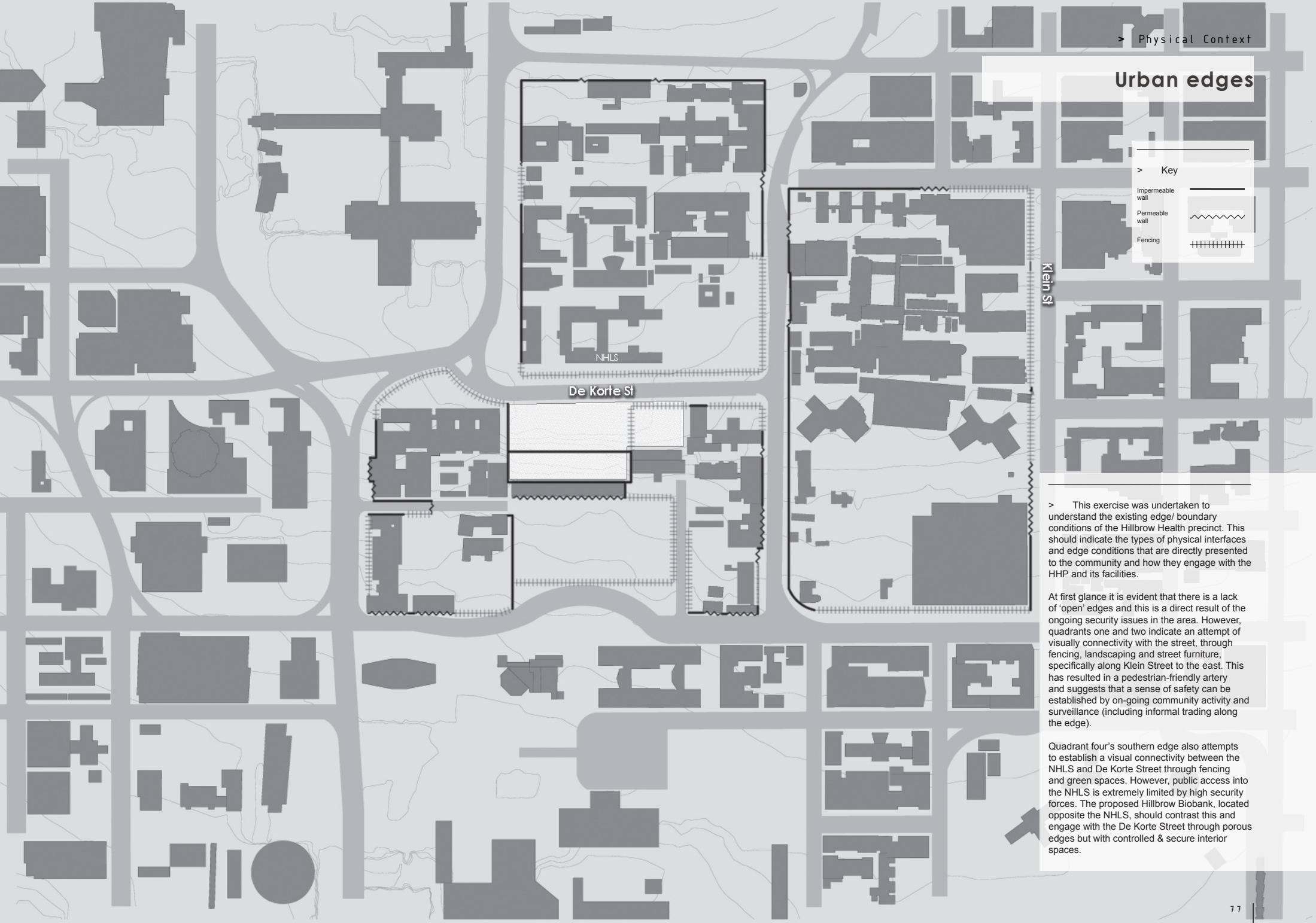






^ The transformation of Johannesburg with the Modern Movement introduced an influx of 'piloti' architecture in Hillbrow. This is perhaps the most successful element from the period that was carried through to the post-modern movement , particularly practiced by the Martienssen followers (Chipkin 1993: 227). This porous edge condition will be considered in the design of the Hillbrow Biobank.

Urban edges



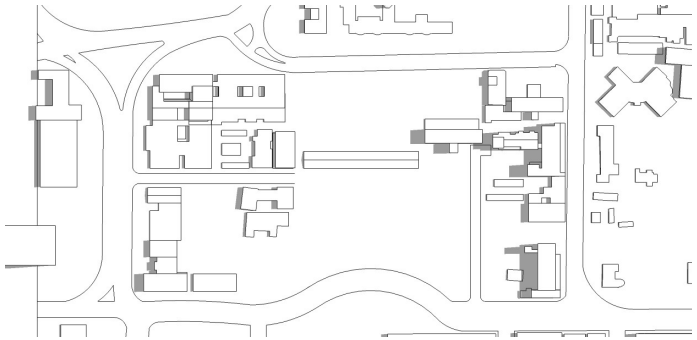
> This exercise was undertaken to understand the existing edge/ boundary conditions of the Hillbrow Health precinct. This should indicate the types of physical interfaces and edge conditions that are directly presented to the community and how they engage with the HHP and its facilities.

At first glance it is evident that there is a lack of 'open' edges and this is a direct result of the ongoing security issues in the area. However, quadrants one and two indicate an attempt of visually connectivity with the street, through fencing, landscaping and street furniture, specifically along Klein Street to the east. This has resulted in a pedestrian-friendly artery and suggests that a sense of safety can be established by on-going community activity and surveillance (including informal trading along the edge).

Quadrant four's southern edge also attempts to establish a visual connectivity between the NHLS and De Korte Street through fencing and green spaces. However, public access into the NHLS is extremely limited by high security forces. The proposed Hillbrow Biobank, located opposite the NHLS, should contrast this and engage with the De Korte Street through porous edges but with controlled & secure interior spaces.

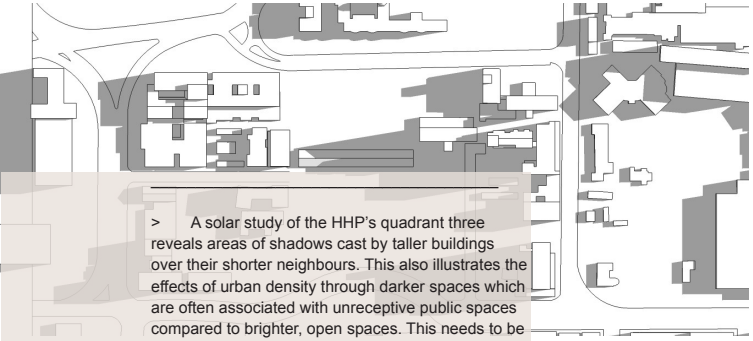
Solar shading study

21 Dec. 7:00



21 Dec. 12:00

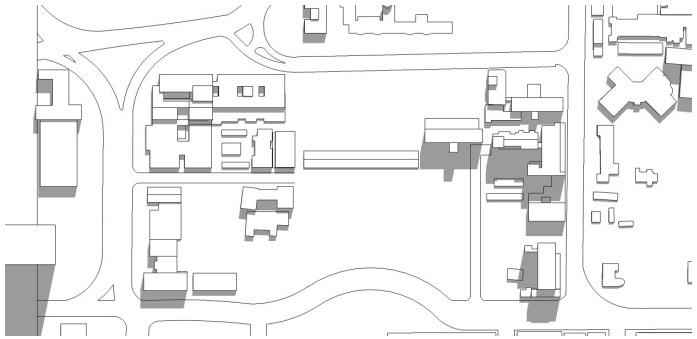
21 Dec. 17:00



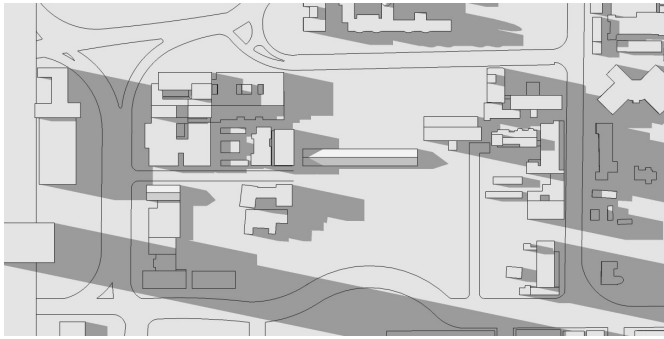
21 March 7:00

> A solar study of the HHP's quadrant three reveals areas of shadows cast by taller buildings over their shorter neighbours. This also illustrates the effects of urban density through darker spaces which are often associated with unreceptive public spaces compared to brighter, open spaces. This needs to be considered when creating inviting public spaces and in contrast shaded areas have been identified for the best possible position for the biobank's laboratories.

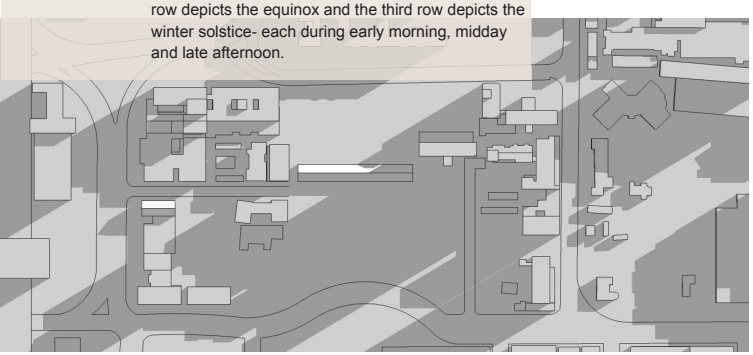
The first row depicts the summer solstice, the second row depicts the equinox and the third row depicts the winter solstice- each during early morning, midday and late afternoon.



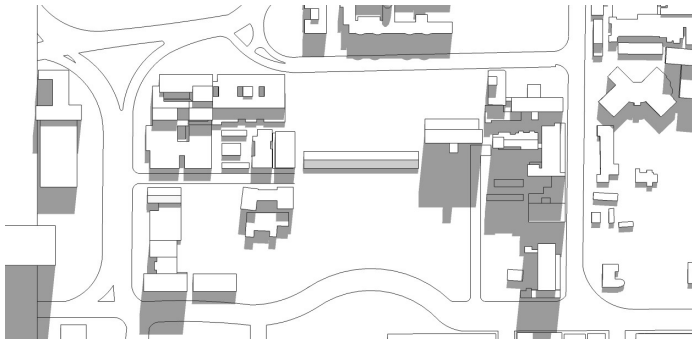
21 March 12:00



21 March 17:00



21 June 7:00



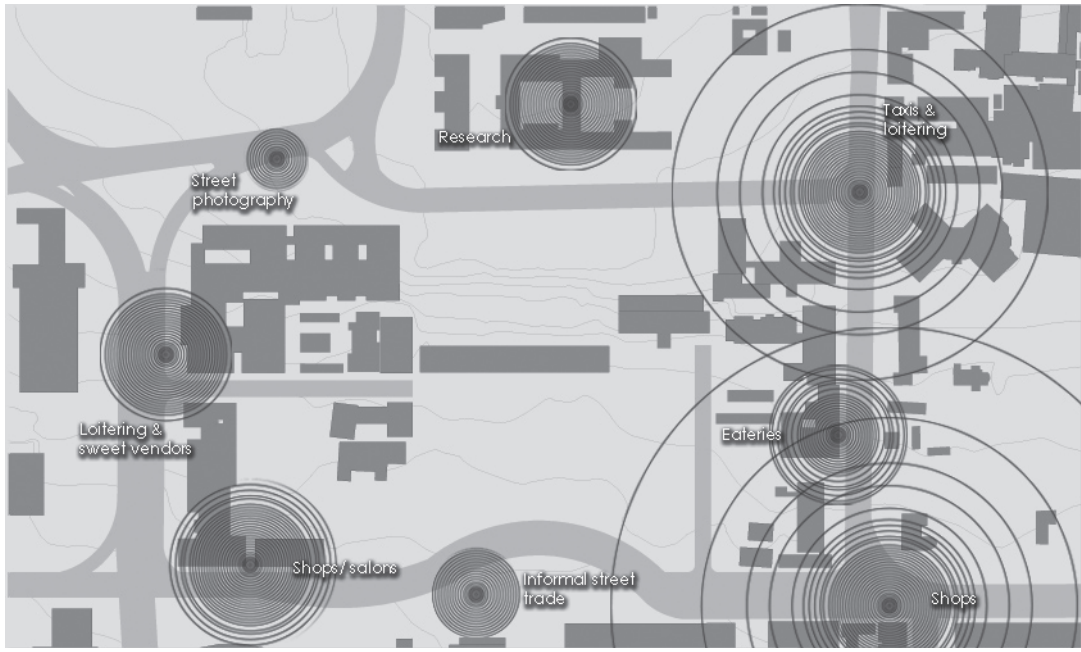
21 June 12:00

21 June 17:00

Urban energies

> This exercise maps out the different street and urban energies around the site. These energies range in scale from individual activities (smaller radiance) to larger scale, group activities (larger radiance). The energies depict physical areas of considerable focus that the Biobank must acknowledge and somehow accommodate through programme, thereby enabling the development of a suitable public interface.

Hillbrow's energy and urban pulse are physically embodied in its residents and streets. The streets are constantly energised and alive with various activities that are the result of a necessity for survival: street vendors, pavement hairdressers and contrasting tensions of prostitution and drug dealing.

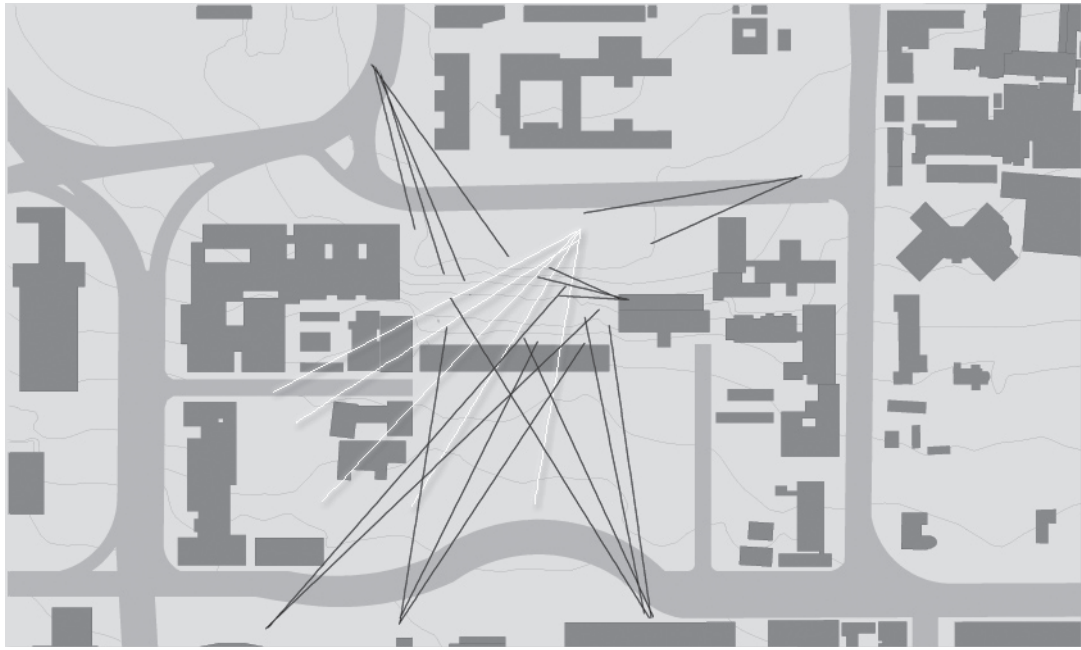


Visual connectivity

> Major views of the Hillbrow Biobank in the existing urban environment should be established to create a visual connectivity between the facility and the city's inhabitants. Major views of and towards the site (depicted in the black lines) have been mapped from intense points of pedestrian movement/activity. A major viewpoint is from Smit Street in the south of the quadrant and this is also due to the natural gradient. This presents the possibility of designing the Biobank as something that is quite visible from the southern parts of the city.

Major views out from the site (depicted in the white lines) are towards the south and south west, offering incredible views of the city.

The western edge of the site should therefore be reserved as an open, public space that allows the public to visually engage with the city. All these views should instil a sense of visual connectivity and enhance the overall urban experience and environment. The Biobank's visual presence should hopefully establish it as a landmark and orientation device within Hillbrow.



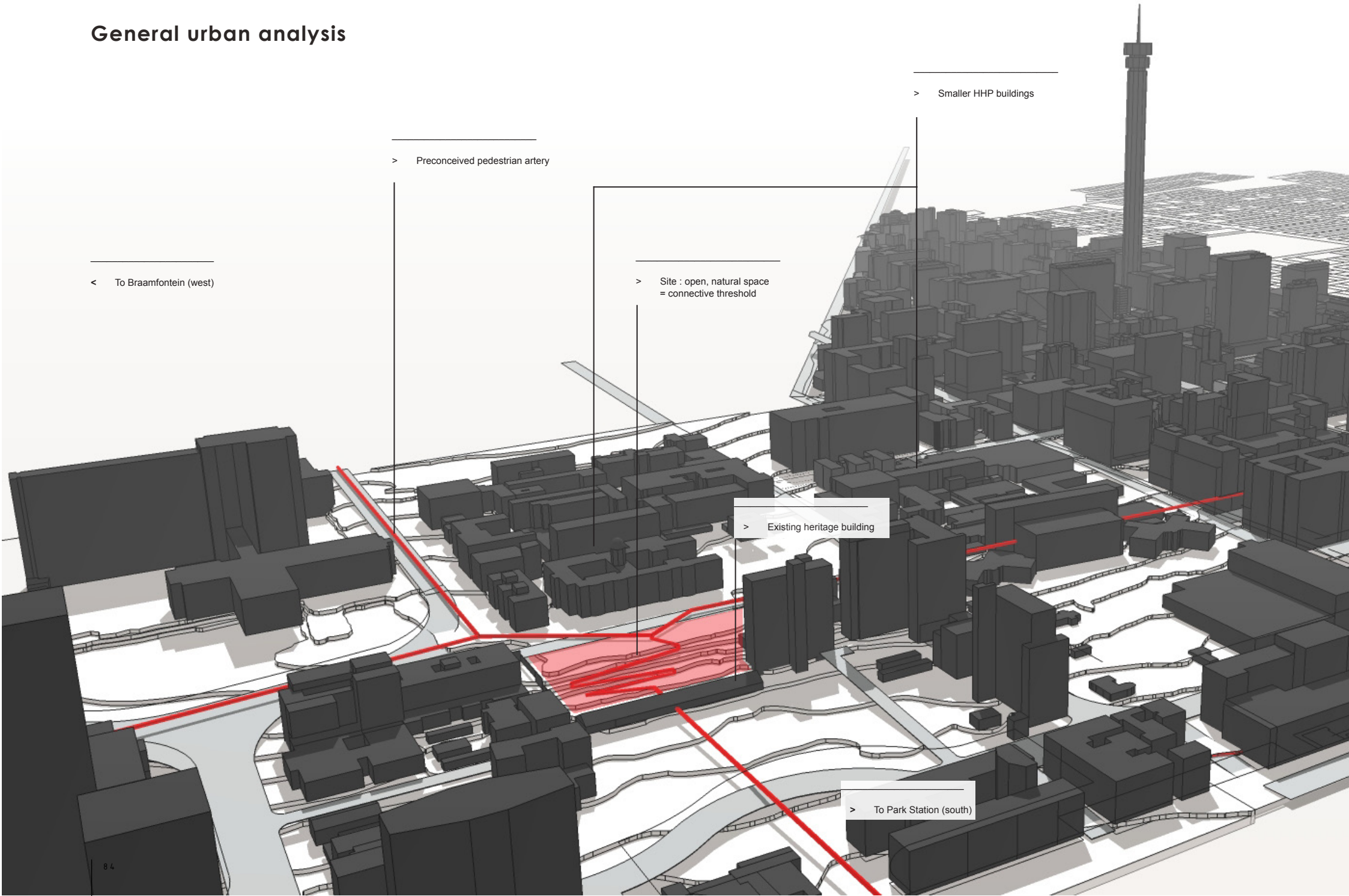
> Taken from the corner of De Korte and Joubert Street. This corner is highly activated by pedestrian movement, as people move from Hillbrow up further north towards the BRT on Joubert Street.

> View of the open site from De Korte Street. Pedestrians pass by the site daily, as they move across from inner Hillbrow in the east (left of the picture) to Braamfontein in the west (right of picture).

^ View from the site, looking south-west to the city. On the right of the image is the existing parking accessed from De Korte Street.

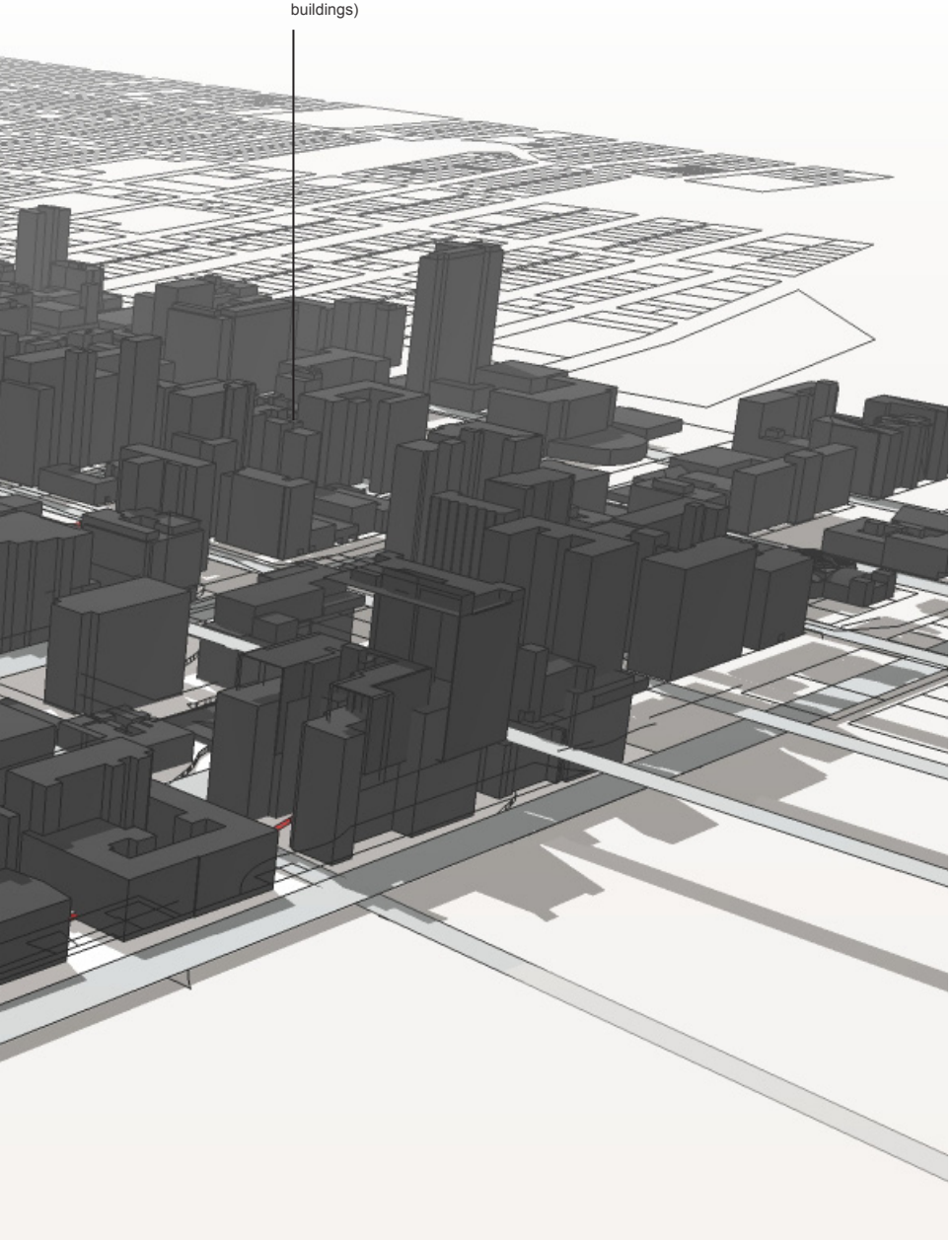
> The tree-lined, southern edge of the site as seen from Smit Street. In the foreground is an open site currently under use for the underground Gautrain construction. The Johannesburg Technical College will redevelop on the site after the Gautrain is complete. Behind this is the rooftop of the existing heritage building that is temporarily being used as an on site office.

General urban analysis



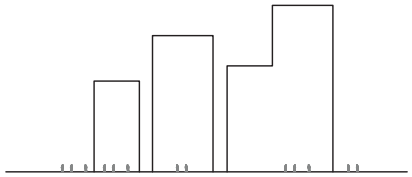
General urban analysis

> High Density Hillbrow (taller buildings)

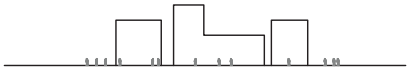


> In an urban environment such as Hillbrow an understanding of the surrounding building densities, scales and heights is required to establish a relationship of the site and new architectural intervention to their greater context.

As discussed before, the Hillbrow Biobank's position can establish itself as a visual presence in the city and this can be further explored by a contrast in heights. The site's nature as an open, unused space in the urban fabric illustrates a point of tension between the two physical layers of the city: natural earth and built mass. However this could be seen in a positive light and the intervention could also consist of an open, public park that facilitates a physical and transitional connection from the high density, residential areas of Hillbrow to the medium density, commercial areas of Braamfontein. In addition to this, there will also be a pedestrian artery flowing through the Hillbrow Biobank, linking Park Station, Hillbrow and the northern parts of the city.



^ Taller inner-Hillbrow buildings are intimidating to people on the street and cast shadows, causing dark and cold streets.



^ Shorter and smaller buildings within the HHP are not as intimidating due to their humane scale. This adds to a receptive, physical public interface.

Contextual Interfaces

Access Through Interfaces

Shifting from the physical context, this section analyses the existing interfacial and community context within the HHP. If the Hillbrow Biobank is to function effectively and to have an impact on the local community through new research and forms of treatment, it should appropriately infuse itself and establish a suitable form of engagement with individuals and possible participants in this form of cutting edge research.

Understanding and applying existing contextual interfaces, both public and private in nature, should also break down any barriers that may arise to new forms of testing, allowing for the development of a new facility that is both comfortable and accessible for all.

> A common site in the HHP, posters such as this one advertise either unregistered (illegal) medical services or traditional African herbal therapies. The later is widely accepted and used by Hillbrow residents in conjunction with conventional 'western' forms of treatment. Traditional African herbal therapy cannot be overlooked and should be integrated into the research basis of the Hillbrow Biobank.

Local Network

> An abstract representation of the existing network within the precinct and Hillbrow. This network will inevitable grow and become significantly symbolic with the Hillbrow Biobank; individuals will be dependant on others' blood samples, in a collective and collaborative effort to find new cures and forms of treatment.

Extensive site visits to the HHP and interviews with numerous health workers highlighted a clear community interface system that works within the HHP. The precinct's information officer Pascal Minani also shared some valuable insight into an existing local community network, that plays a vital role in the system.

Minani (2011) suggested that this network, consisting of peer educators, was crucial to addressing the general negative perceptions within the community, particularly to new forms of treatment and research. This network also extends beyond the clinical environment, introducing new spatial programs and systems associated with general wellbeing through a hybrid of various educational and leisure interfaces.

A series of photos captures some interfaces within Esselin Clinic and is followed by a graphic analysis and exploration of the identified interface system and community network.

^ Community support, lifestyle and health- education classes held in large meeting rooms, such as this one in Esselin Clinic, are the most successful form of community interface, specifically in discussing issues behind testing as well as educating and introducing new forms of treatment and research.

> Other educational interfaces in the forms of posters and TVs within waiting areas are reasonably successful. However, many TV screens do not work and a fundamental problem of language exists. Language and other forms of individual learning systems need to be considered for the Hillbrow Biobank, specifically in educating the community on genetics and lifestyle.

> From the collective interfaces depicted before, individual interfaces emerge in the form of smaller waiting areas and private consulting rooms. Consulting rooms are still pragmatic and allow individuals to enquire on a one on one basis with a health worker. These smaller spatial interfaces ensure privacy for the individual and are heavily dependant on verbal communication.

Sick individual

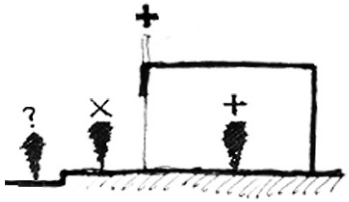
> Seeking general treatment
and/or health advice or alternatives

Uninformed individual

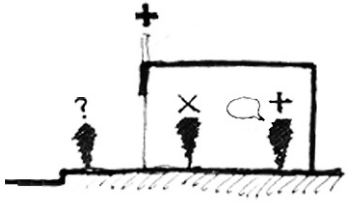
> General community member/
family member/ friend

Health Worker/ Peer Educator

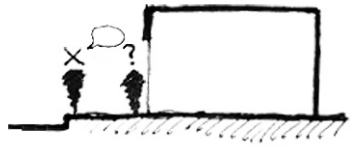
> Individual who facilitates interaction



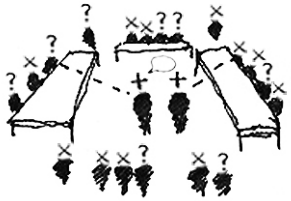
> Physical street interface: sick individual sees Esselin Clinic's street facade and seeks treatment/ general health advice.



> Through private consultation the sick individual is advised to attend the lifestyle and health-education classes.

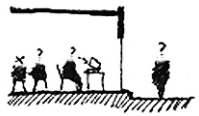


> The informed individual usually informs family relatives or friends to also attend the class.



> The classes form programmed public interfaces of collective interaction, education and awareness. These classes also introduce the community to other resources.

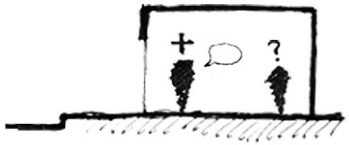
Film screenings



Youth training/ media/ library

Community food garden

> Additional resources form the basis of other forms of public interfaces to educate and interact with the community. These interfaces are generally programmed spaces of leisure and consumption, creating a more comfortable environment to discuss health and other serious issues such as testing.



> From collective group classes and other interfaces, individuals may be encouraged to go for testing and take the next step to private, one on one consulting. This often ends in voluntary testing.

> Individuals eventually feel comfortable with the system and join the community network. They are then informed of other health talks and workshops through sms alerts which they voluntarily attend. The network is therefore an effect system in raising awareness on new ideas and inducing communal participation and interaction on various levels.

Community Infusion

Developing an Appropriate Programmatic Hybrid

"These people want new things..anything that will help them and improve their health, their kid's health. A biobank should be different, it should educate these people...it should be a positive space linked to health improvement, not linked to a clinic. Give them interesting spaces, teach them and they will come."

- Dr Mamsallah Faal, RHRU (2011)

The success of the Hillbrow Biobank depends on its ability to connect to the local community and encourage a voluntary participation. A specific program therefore needs to be developed that responds to the nature of the community and their immediate needs, which may assist in breaking down any potential barriers, while still allowing for important research and development to occur. Barriers may arise due to general suspicion and confidentiality issues but these can be addressed through appropriate educational and private spaces. Another important aspect that needs to be considered is the nature of programmed spaces as either collective or individual (i.e. public vs. private).

For this reason spatial observation studies of Esselin Clinic and the HHP's Centre of Excellence were undertaken and analysed. Additionally, consultations with various health workers in the HHP and discussions with community members (although extremely difficult to conduct at times) were conducted. An appropriate programmatic hybrid, consisting of both public and private spaces, can eventually be developed and will form a "de-institutionalised" public interface between the local community and the Hillbrow Biobank.

> Community support and health- education classes such as this one in Esselin Clinic are successful but have the potential to be expanded to include other forms of education and discussion that extend beyond health talks. These may include film screenings and general community events.

> Decoding the HHP's Program

> Defining an appropriate programmatic hybrid as a suitable public interface requires an understanding of the various programs that exist and those that are lacking within the HHP. The above graphic represents the proportional major programmatic spaces within the precinct, compiled after site visits and interviews.

What is evident is that little attention is paid to community leisure spaces within the precinct, with more focus being paid on treatment and education. The programmatic hybrid must therefore expand on leisure and research programs, enhancing research on various levels. Spaces of treatment, pragmatically required for donating/ testing, need to be kept to a minimum however in order to avoid a clinical atmosphere. Research, leisure and education programmed spaces could also be expanded and complimented with an element of consumption, enhancing and ensuring an appropriate interface as was discovered in the earlier analyses of public blood drives.

> Identified contextual programs


Treatment


Education


Research

Leisure

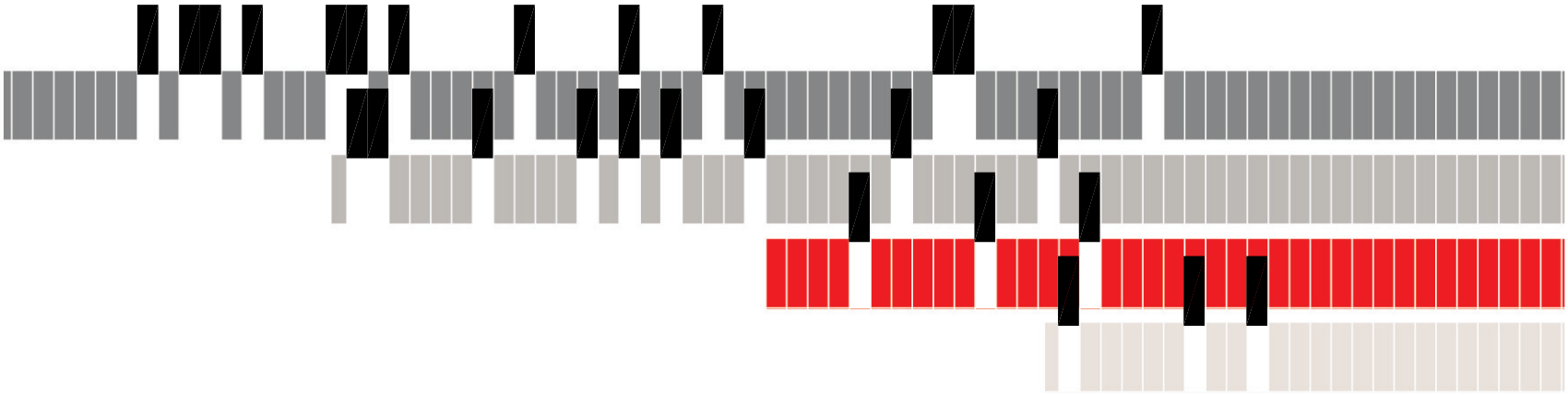
New leisure & consumption programs

> Encoding: Defining the Program

> After an analysis of the precinct's programmatic DNA, new leisure and consumption spaces need to be developed and added to fill in the gaps.

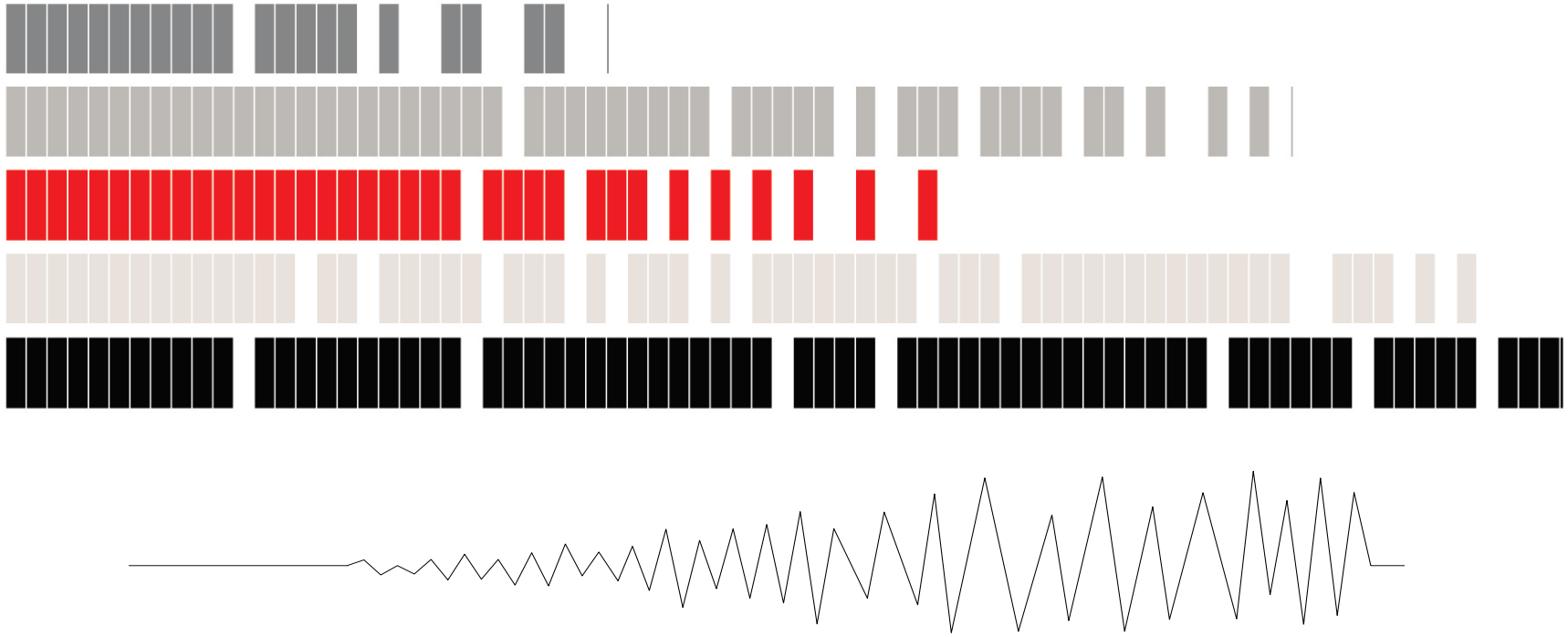
These new programmed spaces are juxtapositioned with existing ones in order to create an appropriate hybrid interface. Increasing leisure and consumption spaces (although still based on health improvement) should attract and expand the existing community network and encourage participation and collective learning.

Other community members, particularly students living in apartment blocks within the precinct and around the third quadrant, will also be attracted to these new spaces which should induce curiosity; eventually enabling them to self discover and learn. These spaces will condition the edges of the Hillbrow Biobank, while secure and private spaces will remain at the core.



PRIVATE

PUBLIC



INDIVIDUAL

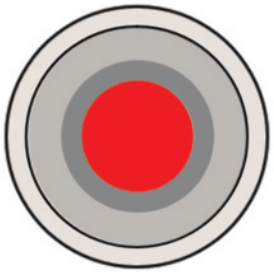
COLLECTIVE

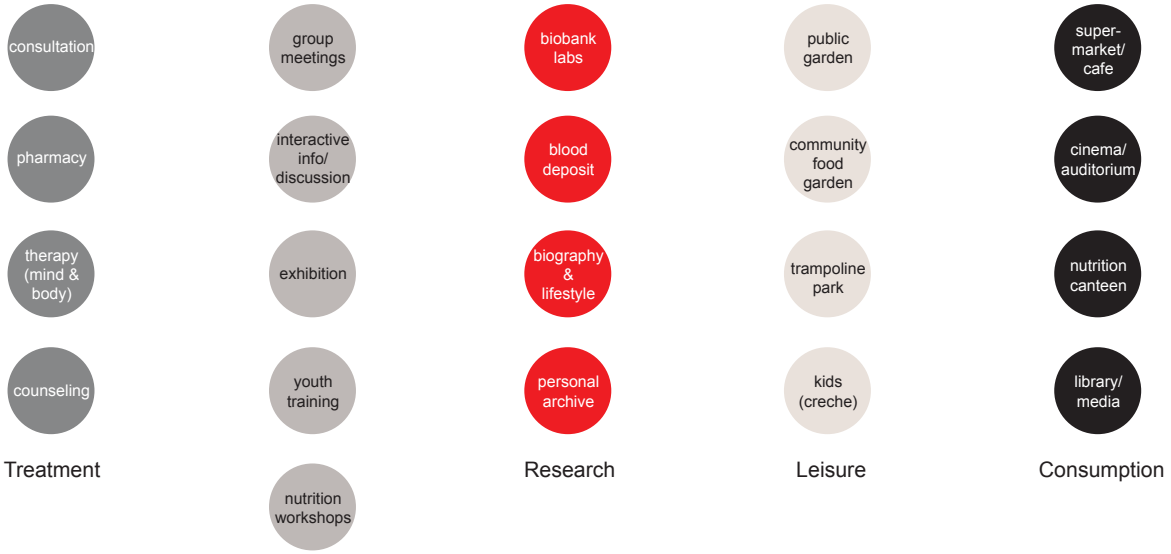
> Private vs. Public

> After analysis of the spatial environments in the HHP, a contextual privacy gradient was established and is represented in the above graphics. What was evident is the general prevalence and success of collective education through group meetings and discussion between community members, which also occurs in waiting areas. Research also extends beyond laboratories and often overlaps with educational interfaces.

This privacy gradient can be simplified into a contextual pulse and carried through in the program arrangement.

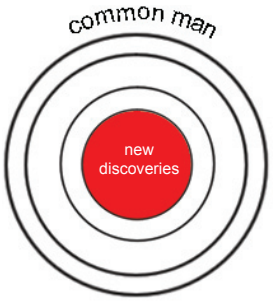
> The arrangement of programmed spaces according to the privacy gradient also needs to assist in new forms of research, development and treatment that reaches the common man on ground level. The arrangement should catalyse a 'ripple-pond' effect, where new discoveries in the nucleus of the biobank could be filtered out through new forms of treatment. However, new treatments don't stop at the individual and are instead carried through to the community in new forms of education that eventually bleed into consumption and leisure interfaces. These new spatial environments in the long term should improve both community and individual health.

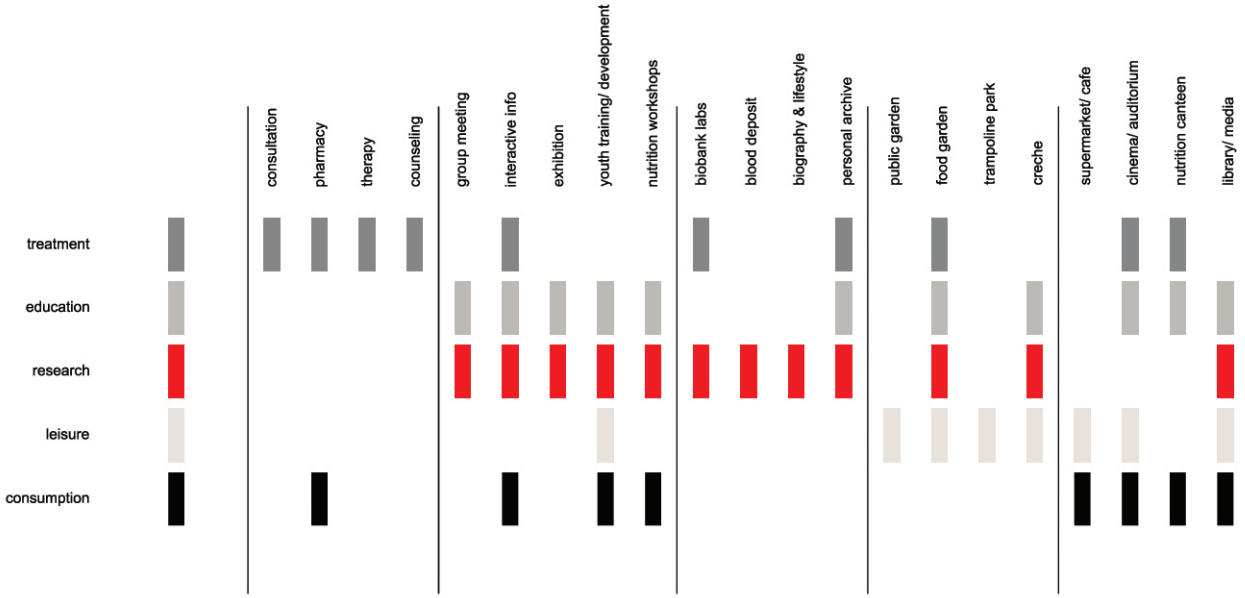




> Transfusions: Program Connections

> The diagram to the left illustrates the introduction of new programmed spaces to existing ones within the precinct. The diagram below right illustrates the possible program links, where existing programs could be adapted and expanded to accommodate new uses. These connections should introduce new progam-based, community interfaces and should infuse the required connection between the Hillbrow Biobank and the local community. Certain spaces which have been identified as private/ individual interfaces will need to be maintained, while a less defensive approach to public spaces and collective interfaces should catalyse communal participation, education on genetic based research, voluntary deposits and general health improvement.





Programmatic Hybrid as Interface and Transitional Route

Hillbrow Biobank: Preliminary Area Schedule

category	proportional % of program	schedule	units	individual area (m²)	total area
COMMUNITY VITALITY					
		reception	1	35	
		security	1	25	
		public foyer & enquiry	1	150	
		enlightenment exhibition	1	100	
		interactive genetics education & info	1	75	
		nutrition center/ canteen	1	150	
		kitchen	1	100	
		pharmacy	1	25	
		shop	1	25	
		organic supermarket & cafe	1	150	
		trampoline park	1	100	
		community food garden	1	200	
		traditional African herb garden	1	100	
	26.5 %				1235 m²
EDUCATION					
		youth training: library and media	1	100	
		multipurpose auditorium/ cinema	1	200	
		foyer/ display	1	150	
		group discussion/ staff training	1	180	
		waiting	1	20	
		group officer's office	1	10	
		individual discussion/ consultation	1	80	
		outdoor discussion/ garden	1	100	
	18 %				840 m²
KID'S ZONE					
		creche/ child development	1	120	
		toy bank	1	15	
		trampoline/ outdoor play	1	100	
	5 %				235 m²
THE DEPOSITORY*					
		reception	1	20	
		waiting	1	25	
		private consulting rooms	6	10	60
		biography & lifestyle (recording & deposit)	1	120	
		physical check rooms	2	15	30
		personal archive (individual feedback)	1	100	
		counseling (genetics) rooms	5	15	75
		therapy rooms (body/ alternative)	5	20	100
		prayer room	1	20	
		general administration office	1	15	
	12 %				565 m²

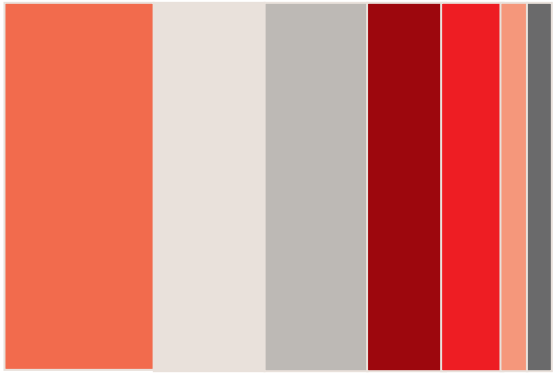
The programmatic hybrid is expanded and developed into spaces and areas. The program has been divided into seven categories: community vitality (public interface and information), education, kid's zone (creche and child development), the depository (as research anchor), the biobank (private laboratories), administration and public park.

The program is arranged across the site according to the natural topography gradient and the identified contextual pulse, developing an appropriate privacy gradient and ensuring a transition from collective interfaces to individual, private ones.

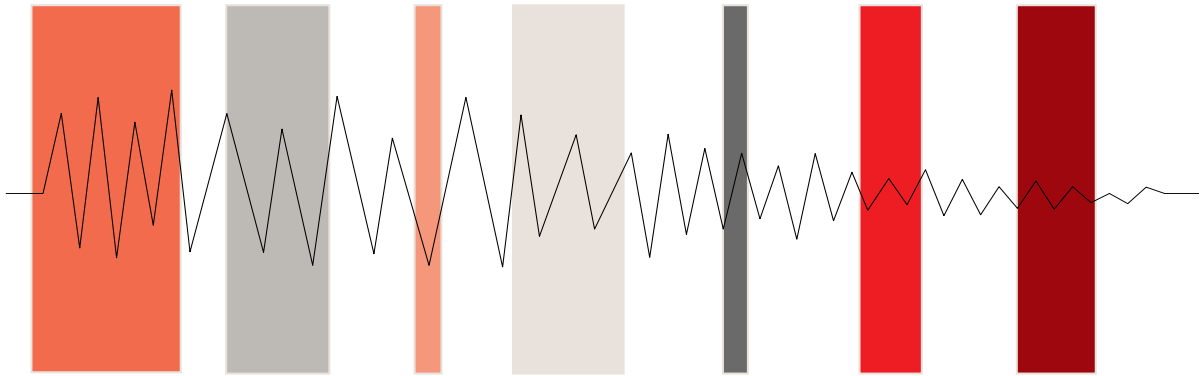
category	proportional % of program	schedule	units	individual area (m²)	total area
THE BIOBANK **					
		reception & lobby	1	80	
		security check	1	50	
		general admin offices	5	15	45
		staff room	1	30	
		meeting rooms	2	20	40
		overnight researchers' quarters	2	20	40
		changing rooms/ ablutions	2	25	50
		sample receiving & quality control	1	35	
		mechanical workshop	1	30	
		blood sample cold storage	2	50	100
		central analysis/ examination	1	75	
		private researchers' offices	4	15	60
		general laboratories	4	15	60
	15 %				695 m²
ADMINISTRATION					
		reception & waiting	1	30	
		public relations (open plan)	1	30	
		director of nursing	1	15	
		head of research and development	1	15	
		finance	1	15	
		director	1	25	
		boardroom	1	30	
		staff room	1	25	
	5 %				185 m²
PUBLIC PARK					
		landscaped park/ thoroughfare	1	900	
	18.5 %				900 m²
OTHER					
		HV/AC plant room	1	50	
		parking (replace existing & new)	60	15	900
		school bus parking	2	15	30
		bio-waste store	1	10	
		loading bay	1	15	

* Based on information from reports by Park, Sgaier and Walsh (please refer to reference list).

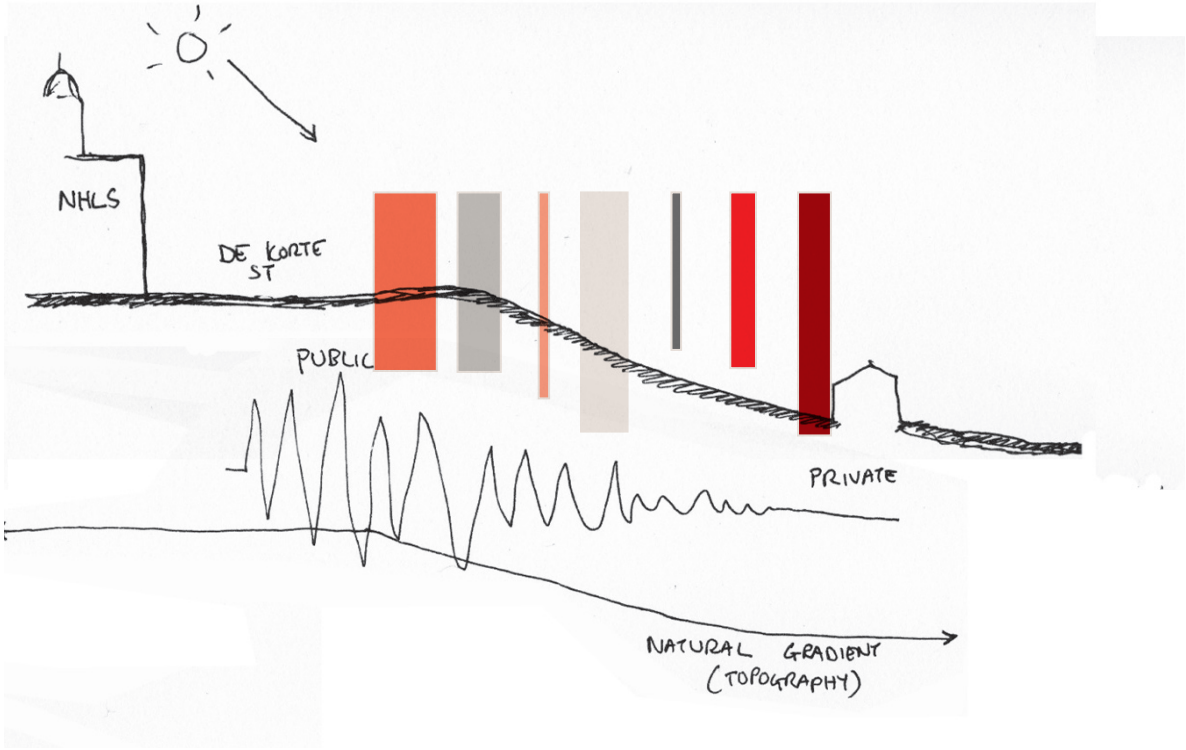
** Based on information from the WHO reports (please refer to reference list).



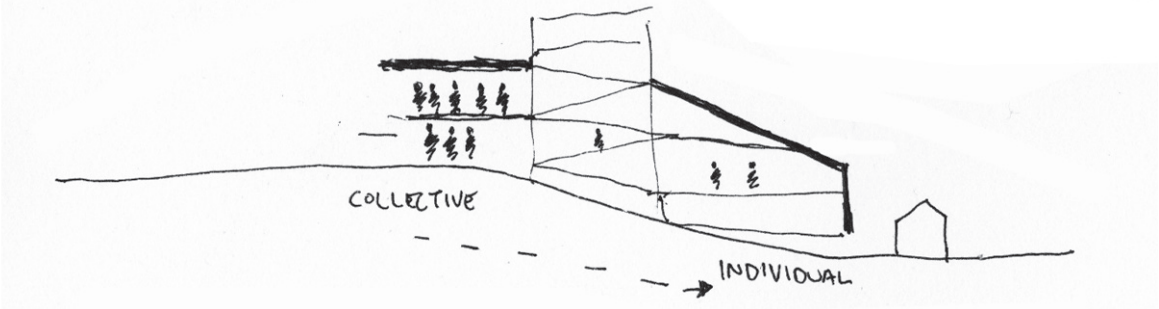
> The developed program is arranged in descending proportional area values from left to right.



> As part of the first design concept, the program is then arranged according to the identified contextual pulse to develop a suitable transitional route for visitors to the Hillbrow Biobank. Visitors are taken from lively collective programmed spaces at street level, to more private individual spaces towards the south. This ensures that a suitable privacy gradient is maintained and should instil a sense of comfort in a visitor.



< Application of the programmed transitional route across the site, with use of the site's naturally steep gradient to enhance the privacy gradient.



< The transition from collective public interfaces facing De Korte St, to private interfaces towards the south.

< The natural gradient of the site also provides the opportunity to play with scale. A less intimidating scale for visitors is placed on De Korte street on arrival, while a larger scale is placed on the south edge to accommodate private programs and to make the building more visible from the south of the city. These scales also allow for general secure spaces to be placed at a "higher" level, away from the public ground space.

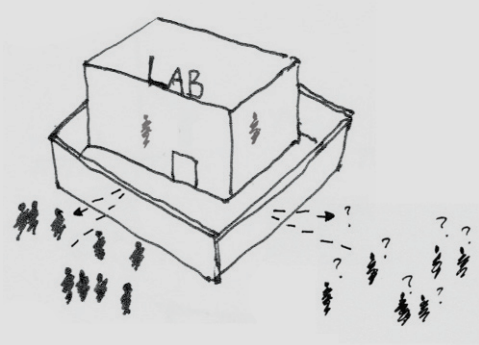
Creative Process

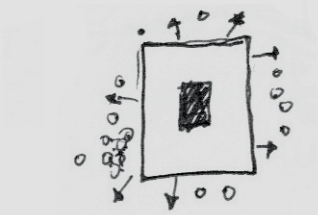
Exploring A New Research Typology

Redefining Research and the Institution

The traditional architectural object of the research institution as a publicly-inaccessible, introverted box structure has been challenged over recent years by numerous and significant social and environmental issues. New research typologies that illustrate and express a direct engagement with these current issues are now being explored through new systems and forms.

A conceptual exploration of breaking down the object through porous edges and appropriate interfaces seeks to redefine the typology into a new one that is publicly accessible and encourages a critical engagement. The new object should eventually reflect its new spatial systems of cutting edge research that has extended beyond the confines of the laboratory.





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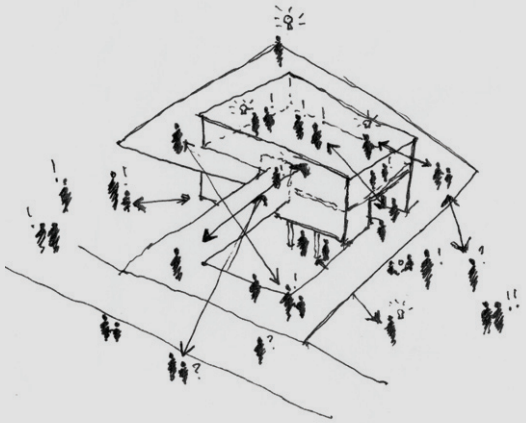
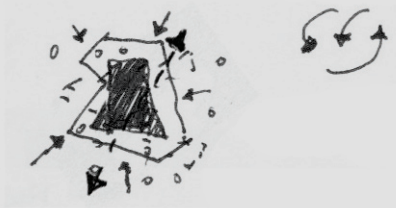




^ **Traditional Research Institution**

The traditional research block form was successful in keeping out the public through numerous forms of boundaries and static forms.

^ **A New Research Typology**

The proposed contemporary research typology is a permeable facility that engages with the public, breaking down certain boundaries, while maintaining private and secure spaces at the core. The porous edges are activated further by context-based interfaces that induce a symbiotic engagement between the facility and its community.

Concept Development

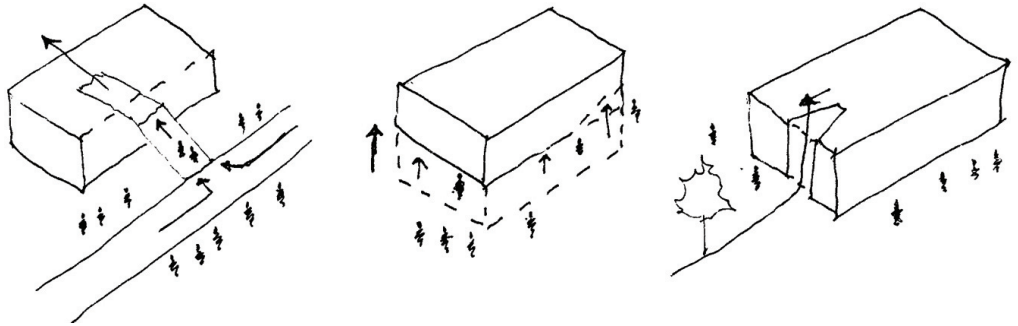
> **Permeable edges (breaking through the traditional block)**

From left to right:

> Street artery in: urban energy flow in and around block

> Lift the block up: open public edges

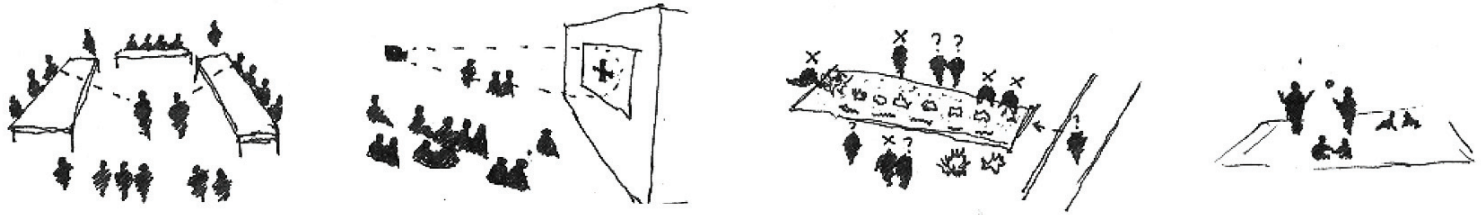
> Natural landscape: edge incisions



A

> **Programmatic hybrid (suitable community interface)**

> Consumption, leisure, education, treatment and research

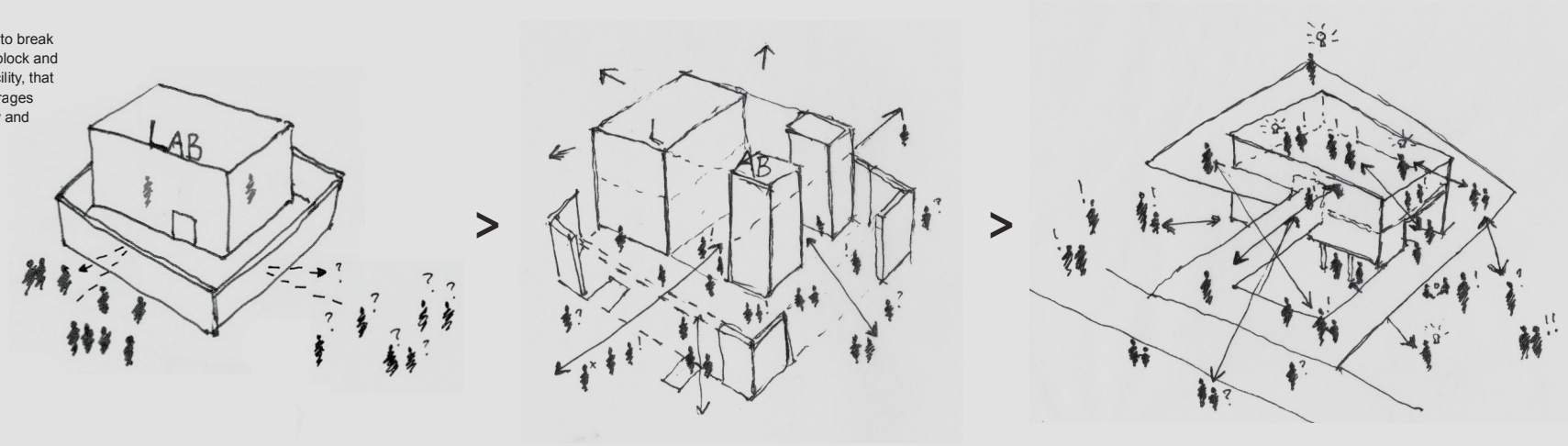


B

> **Developing the Hillbrow Biobank**

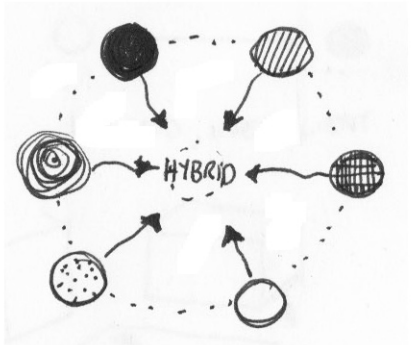
> Combing A and B as a system to break through the traditional research block and develop a de-institutionalised facility, that is publicly accessible and encourages a transfusion between the facility and community.

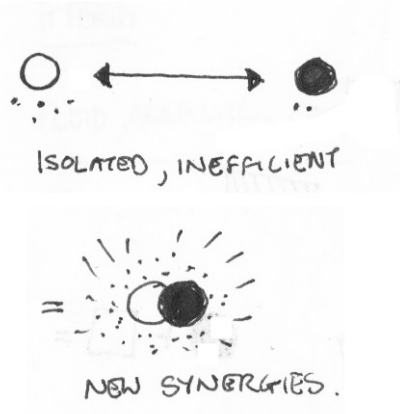
A + B >

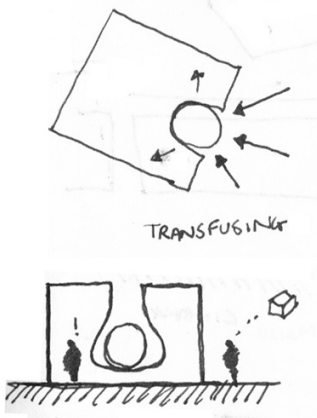


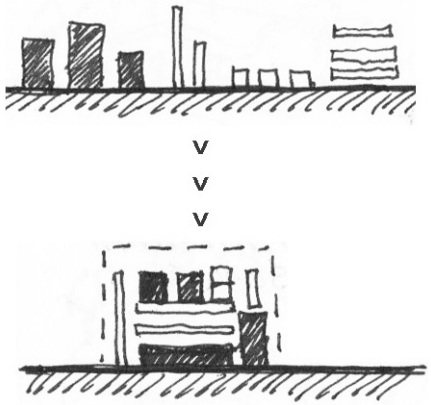
Design Process

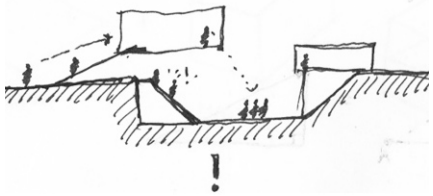
Earlier in the year, a ‘design charette’ was held as a preface to the design process. This charrette involved the exploration of various theoretical themes through diagrams and physical conceptual models. In this case, themes of ‘hybrid’, ‘connection/diagonal link’ and ‘fluid’ were explored. Some outcomes proved to be irrelevant, while others were carried through and considered in the extended design process that was to follow later in the year.

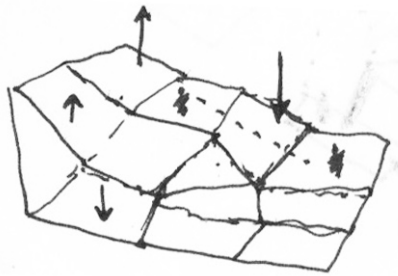


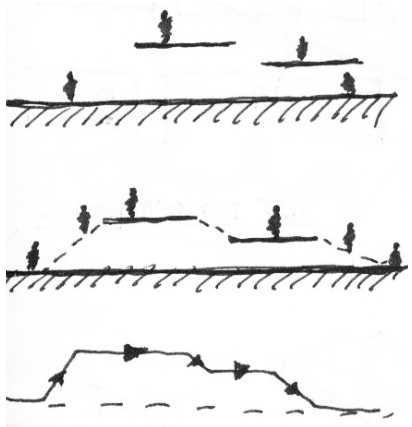


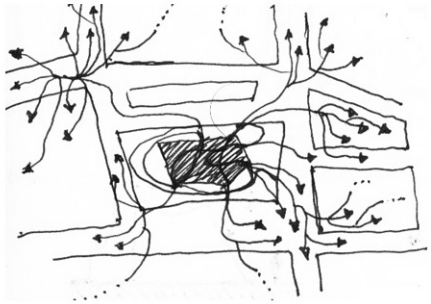


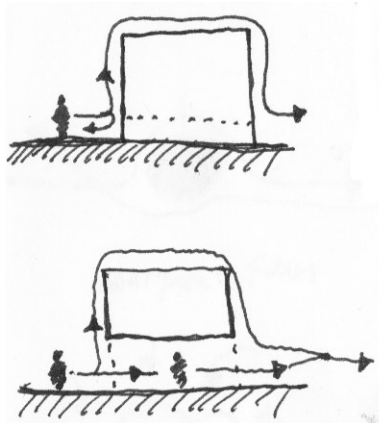


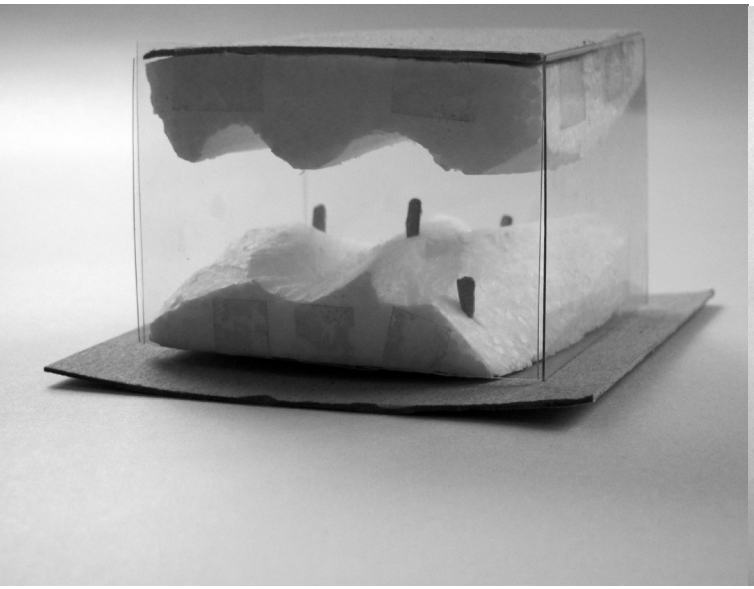


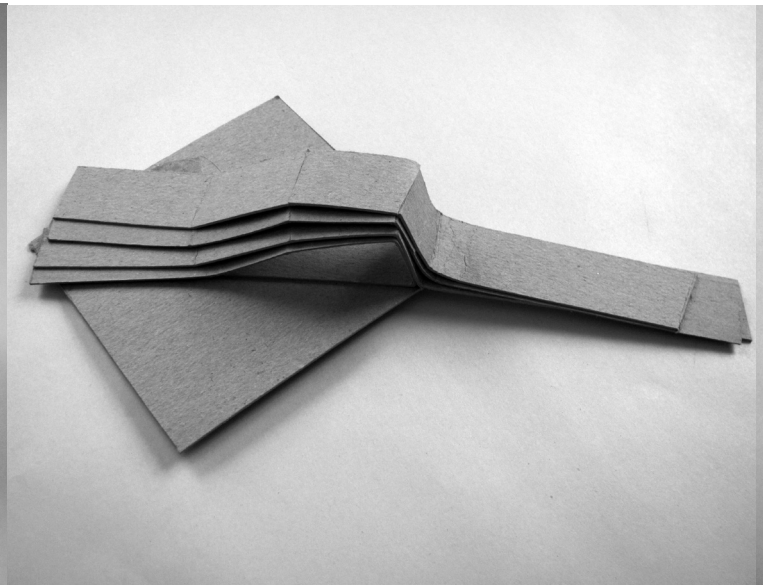


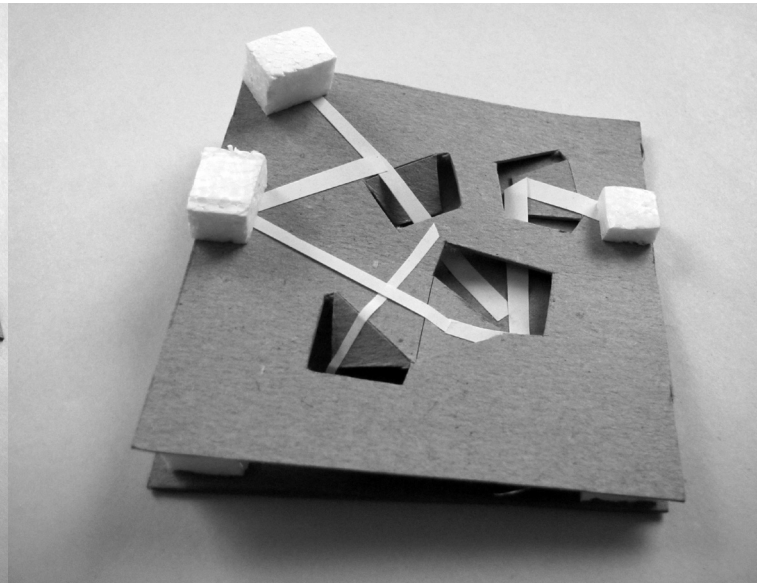


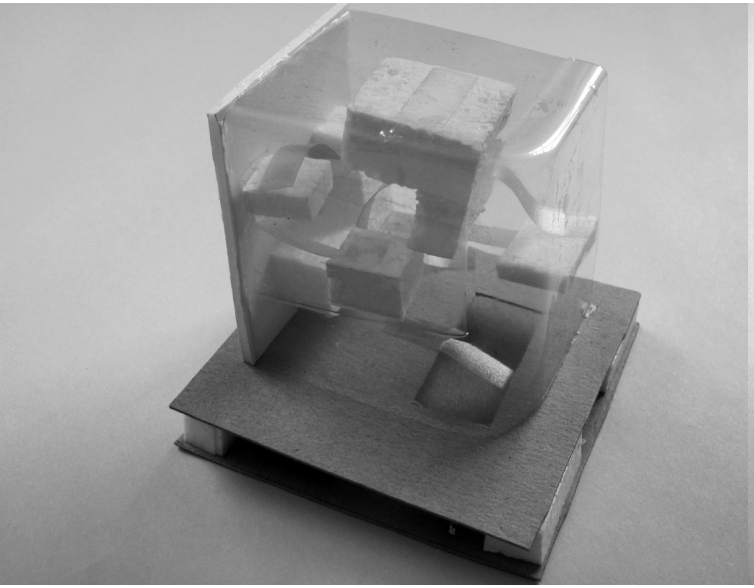


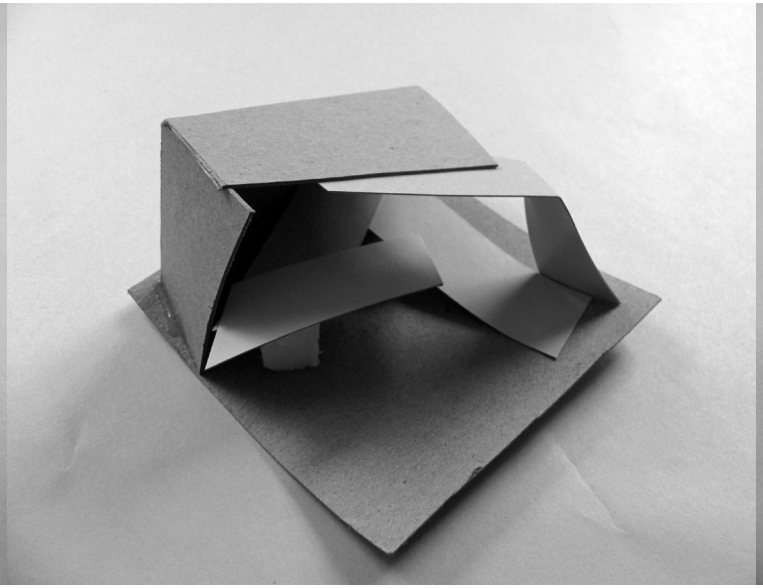


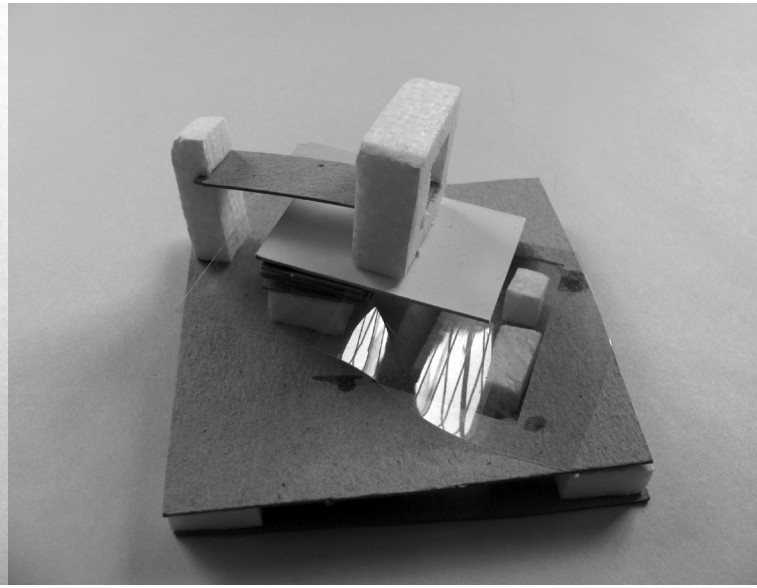




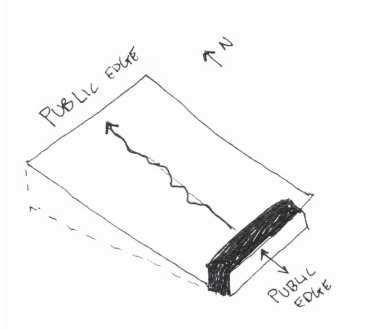


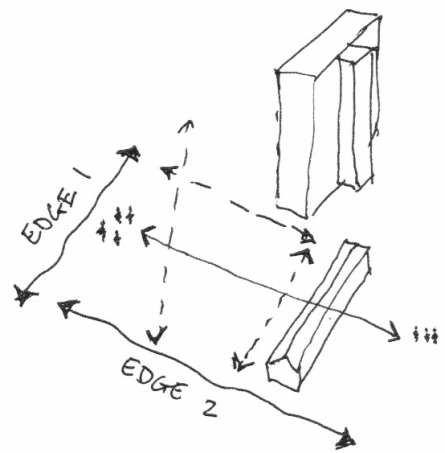


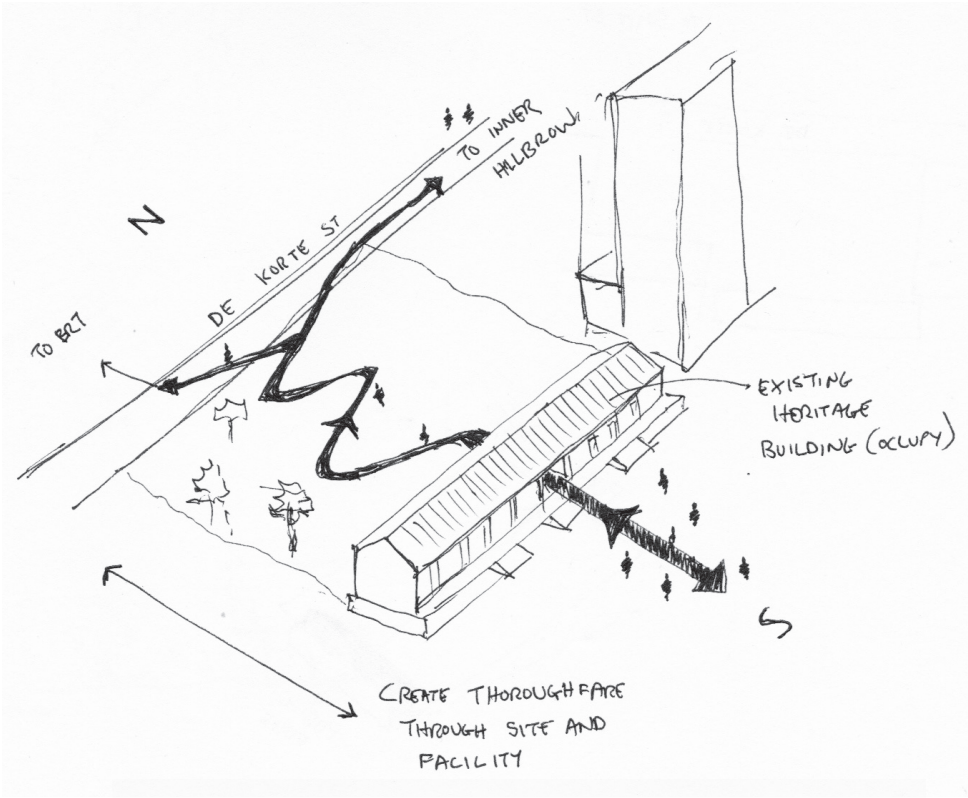


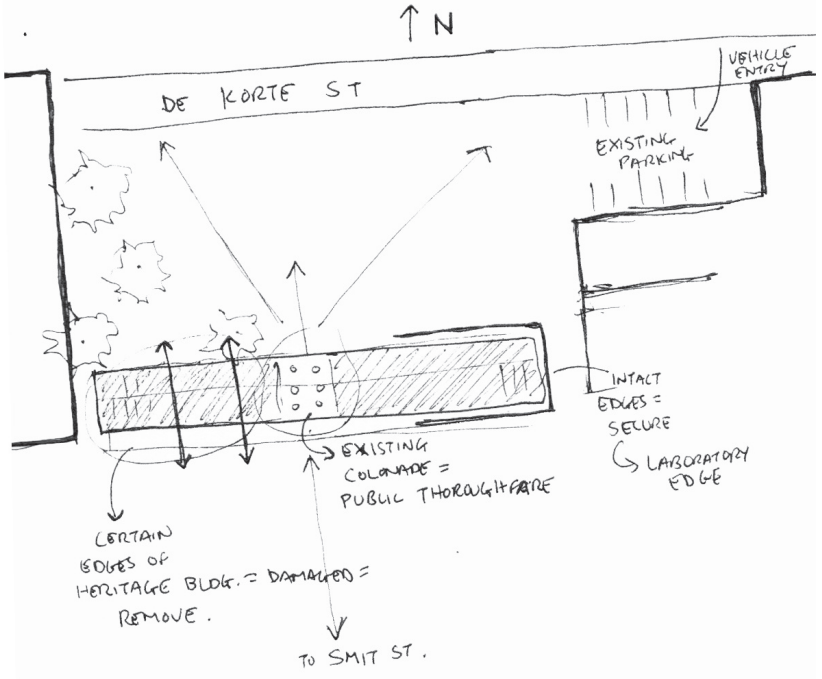


Site Response

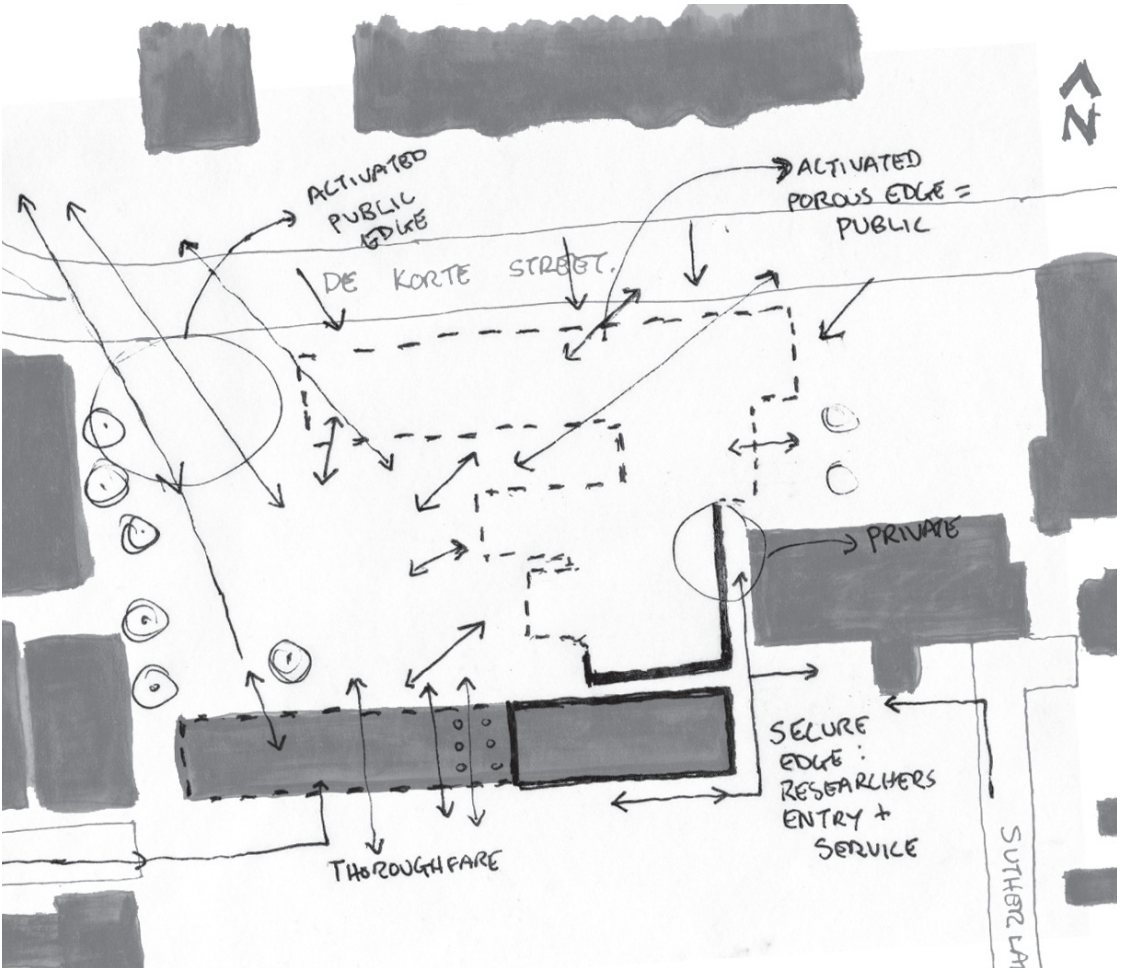


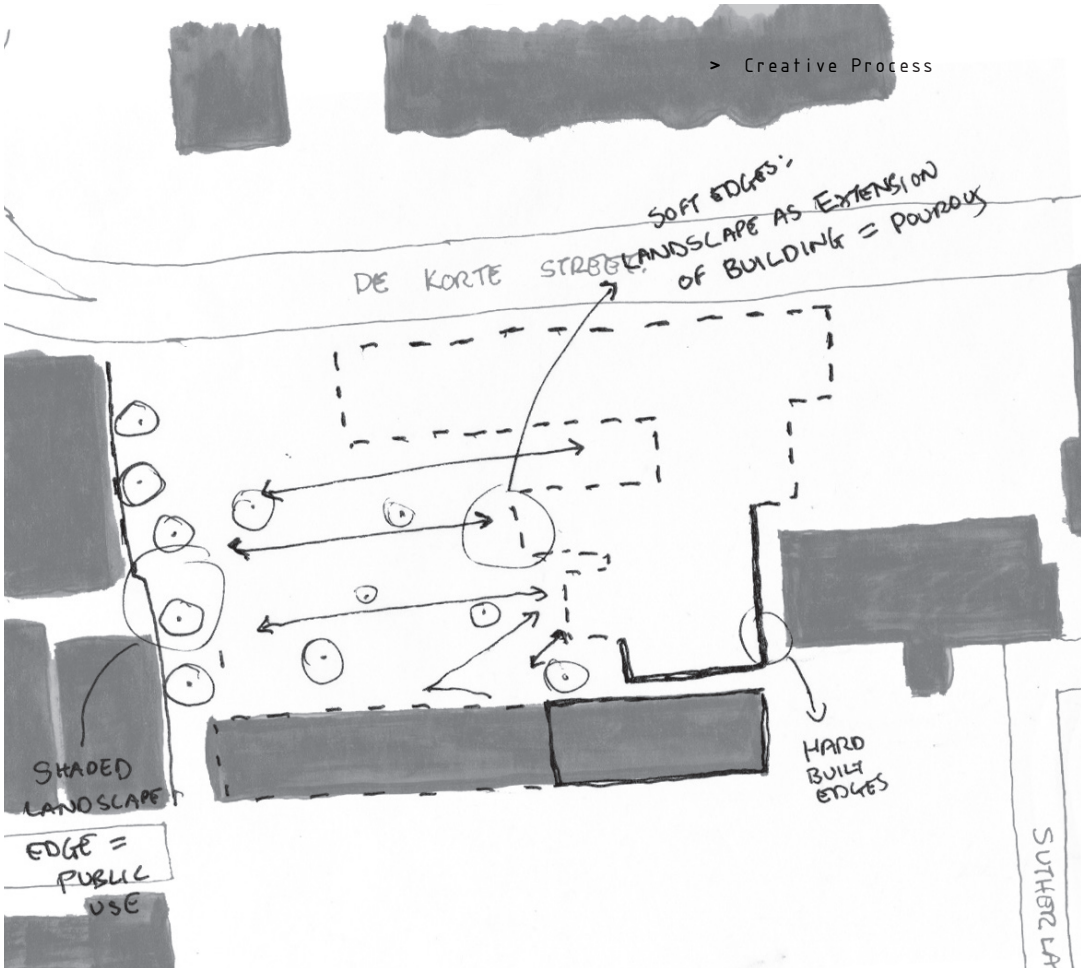






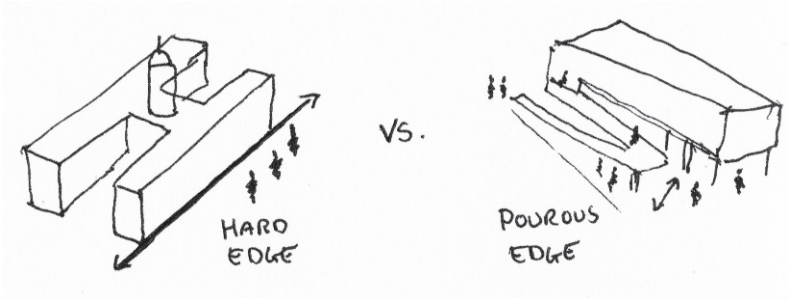
The south edge of the site is defined by an existing heritage building that originally houses the old technical workshops of the Johannesburg Technical College. This building is incorporated into the design as it is currently being used for temporary on site construction offices. The building could be developed as a permeable edge, by reactivating the enclosed colonnade and introducing open edges where walls and windows have been damaged by soil loads on the north. A new pedestrian thoroughfare is developed on a north-south axis, from De Korte Street through the Hillbrow Biobank, the public park and through the heritage building through to the south. Collaborating the thoroughfare and programmed transitional route, the western and northern edges are developed as permeable edges that are open to the public.





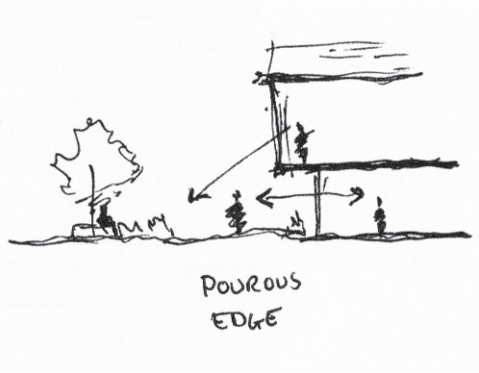
> Public and private edges

> The north street edge has been identified as a charged pedestrian zone from the mapping process. The main entrance to the Hillbrow Biobank is therefore placed on the north, with a lifted edge that provides shade and invites pedestrians passing by. This edge is also developed as an extension of the street: a ramp lifts off the pavement and wraps around the northern and western edges. This ramp leads directly to group meeting venues and the auditorium and contrasts the impermeable edge of the NHLS that sits opposite.
Part of the southern edge forms the main service and researcher's entrance which is secure and inaccessible to the public.



> Landscaped western edge

> The western edge of the building, specifically the 'ground' plane is also developed as a permeable edge that engages with the landscape and the new pedestrian route. The landscape is also designed as an extension of the building, creating a fluid flow of space between inside and outside. This edge is therefore programmed with public interfaces, primarily the nutrition zone and canteen.



Urban Intervention

In addition to the introduction of the Hillbrow Biobank to the HHP , the surrounding urban condition also needs to be addressed and improved in order to ensure both the precinct's and the Hillbrow Biobank's survival. The following strategic points have been identified as part of an urban intervention that is in line with the HHP's goals:

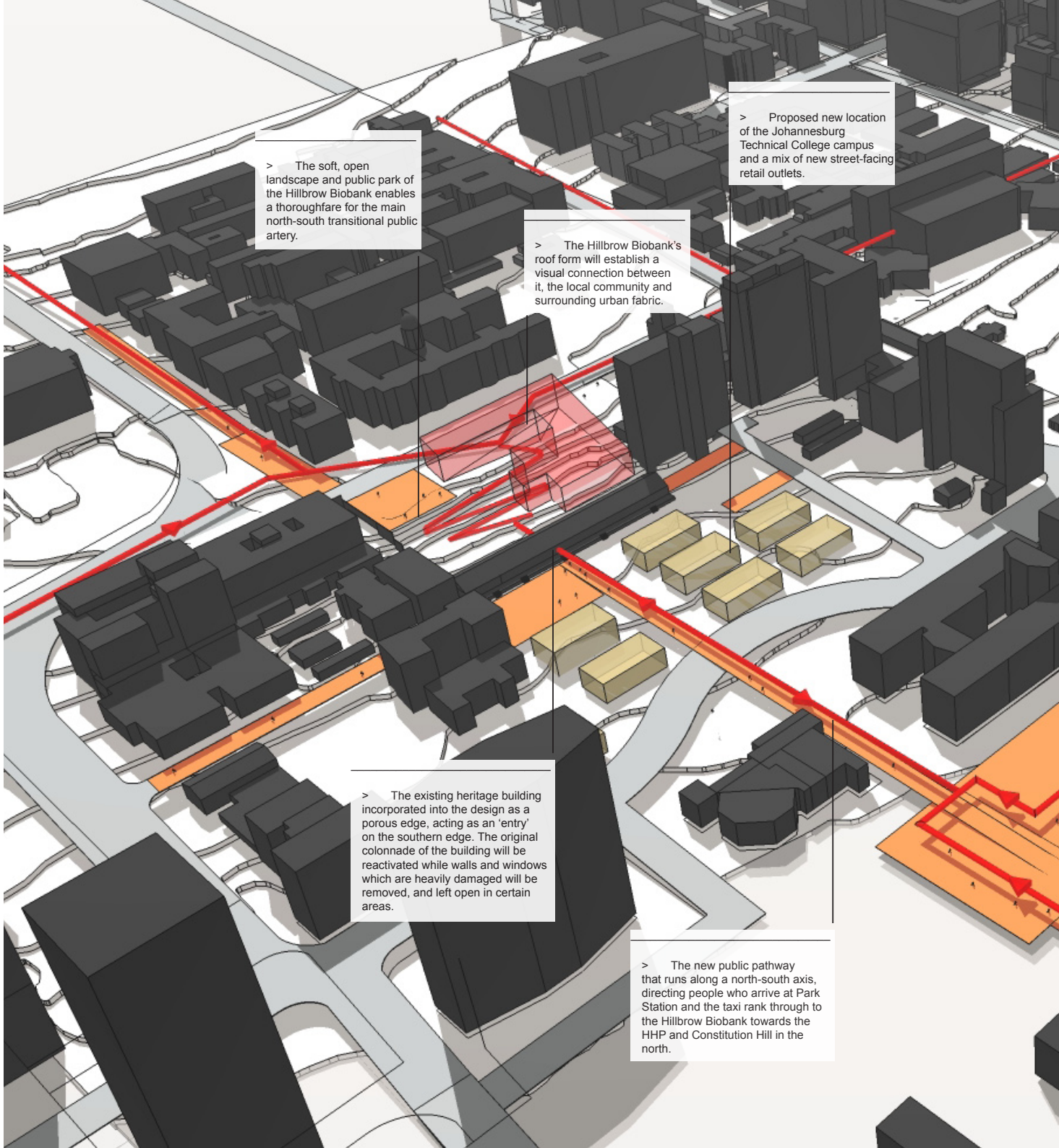
> Generally improve the connection between the HHP and the Hillbrow Biobank to the surrounding urban fabric.

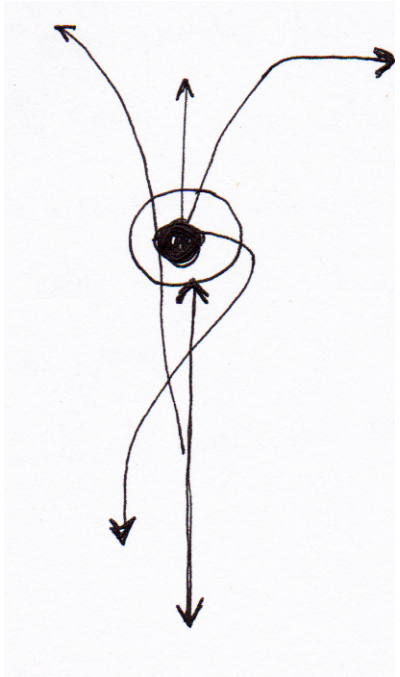
> Introduce new public pathways that are pleasant and allow for easy flow and connectivity to the precinct and city.

> Activate unfriendly and unused urban voids and alleys.

> Introduce good quality, open, public spaces within the precinct that ensure safety and comfort for all users.

> Introduce a critical mix of other commercial and retail facilities that sustain the precinct and health cluster in the inner city.

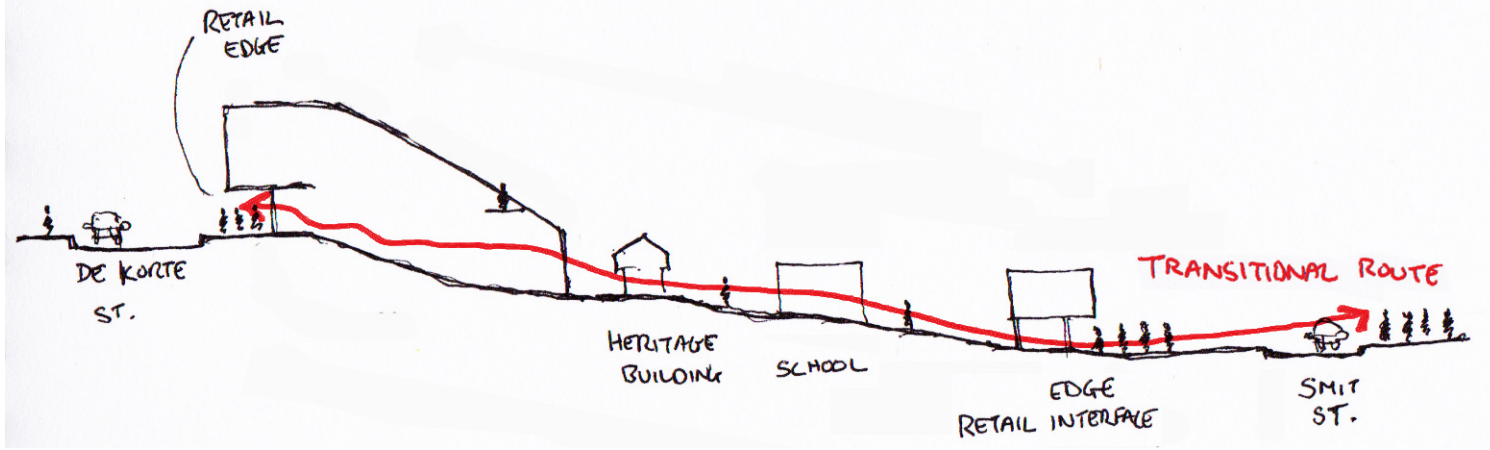




^ Conceptual diagram of the Hillbrow Biobank's position as a thoroughfare and connective element in the urban fabric.

> Street facing retail outlets (A) should activate the edge of Smit Street and form a suitable interface for those who arrive from Park Station, before they carry on through the transitional route. These also act as a buffer for the Johannesburg Technical College buildings (B).

> As part of the college campus, the canteen (C) will be partially serviced by the Hillbrow Biobank's community food garden. This should also infuse a direct link between the neighbours and will also create a platform of income for unemployed members of the community.



> Conceptual section across the north-south axis, illustrating the transitional route through the Hillbrow Biobank.

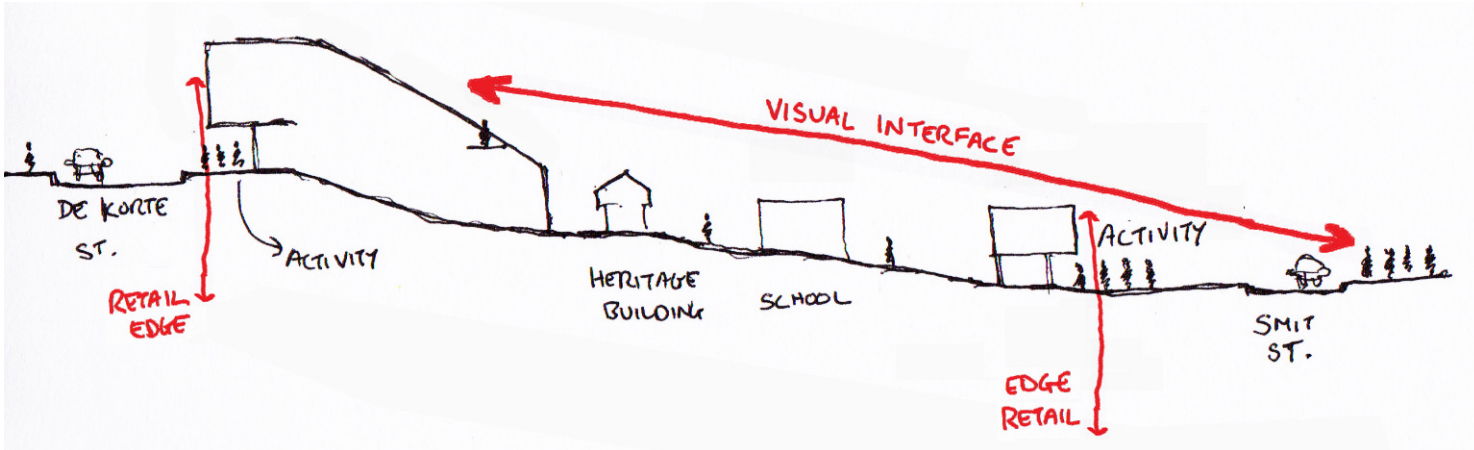
> Existing urban voids and unused alleys will be redeveloped as public pathways with lighting, trees and street furniture. This particular path draws pedestrians from Rissik Street towards the Hillbrow Biobank.

> New landscaped pathway to Braamfontein BRT

> New researcher's and service entrance for the Hillbrow Biobank.

> New entrance for the Johannesburg Technical College from Sutherland Avenue.

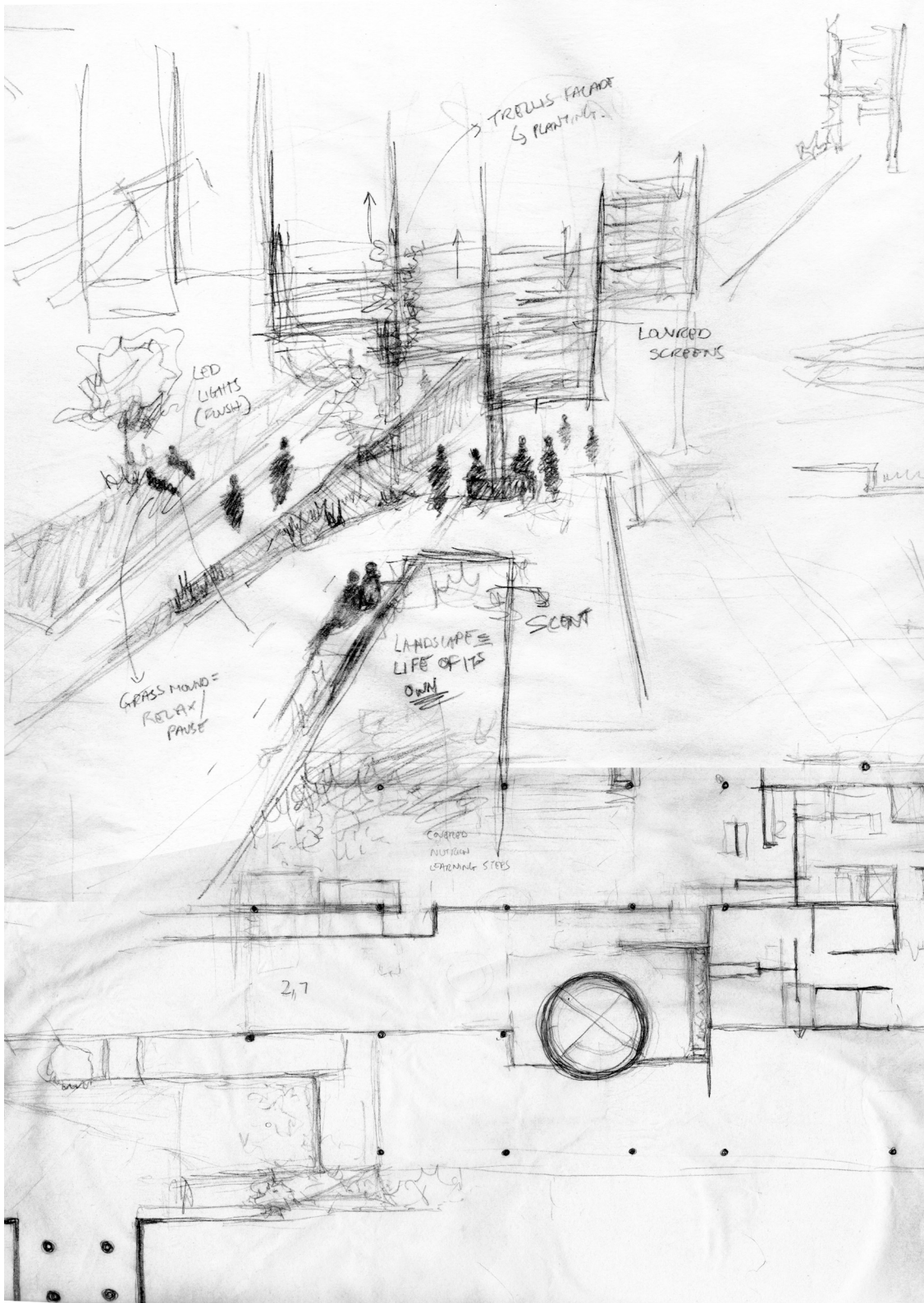
Sutherland Ave

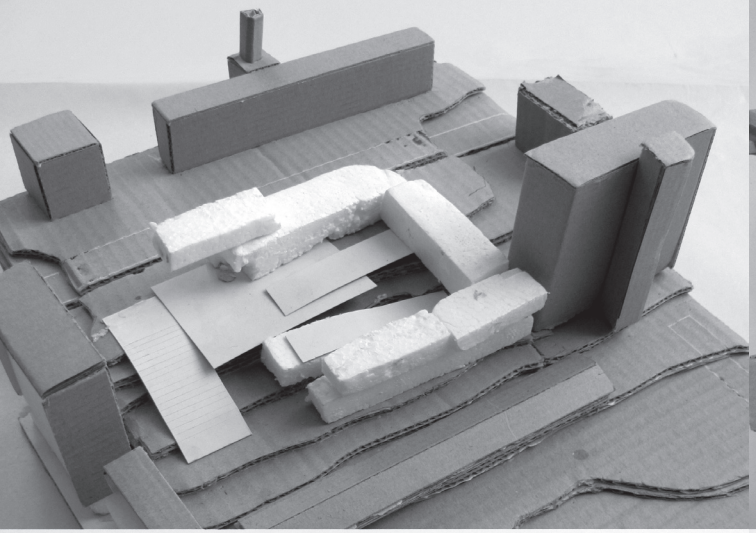
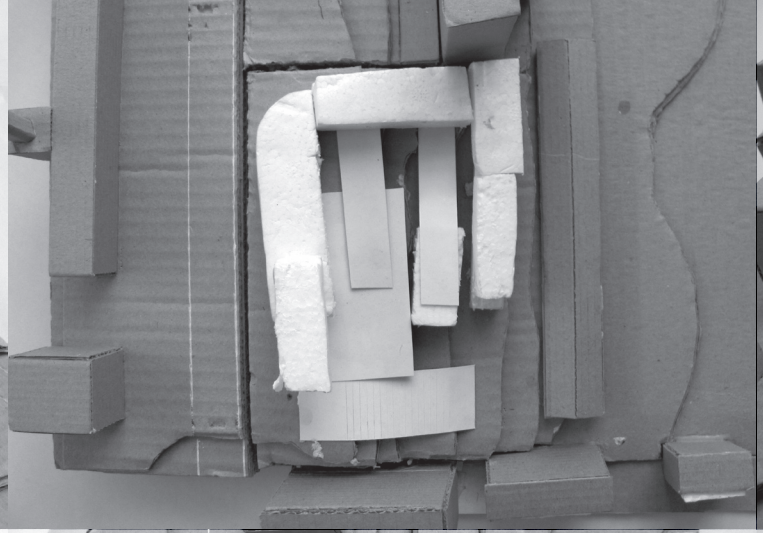
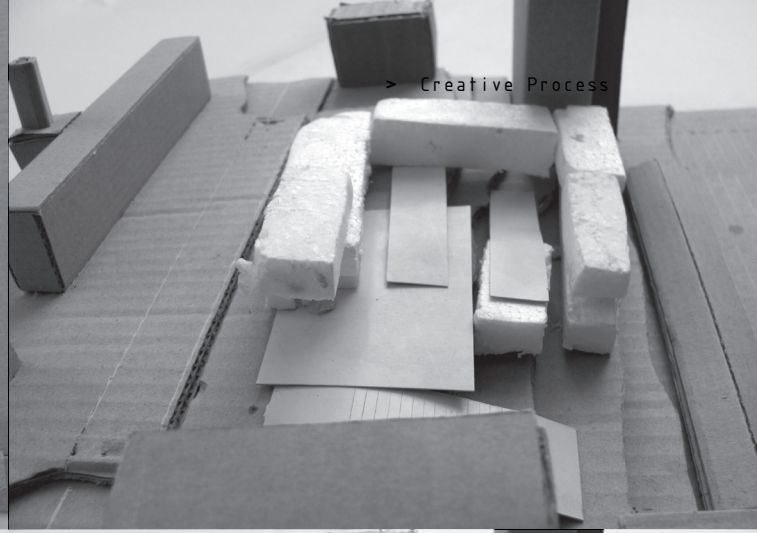
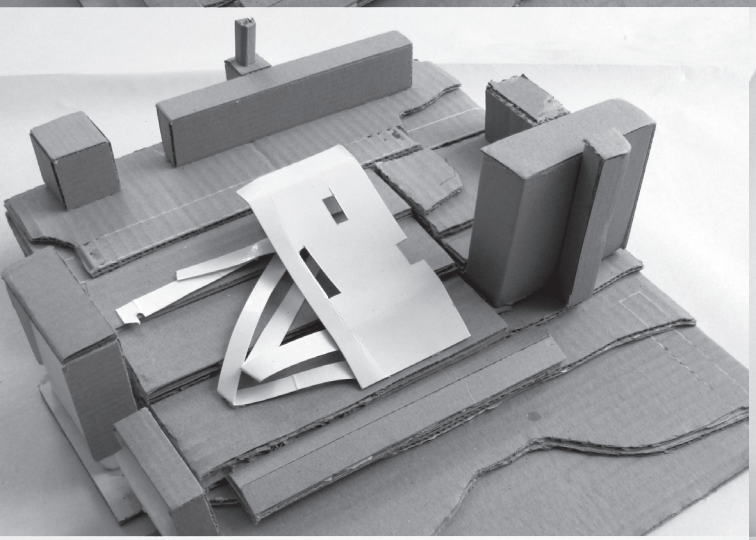
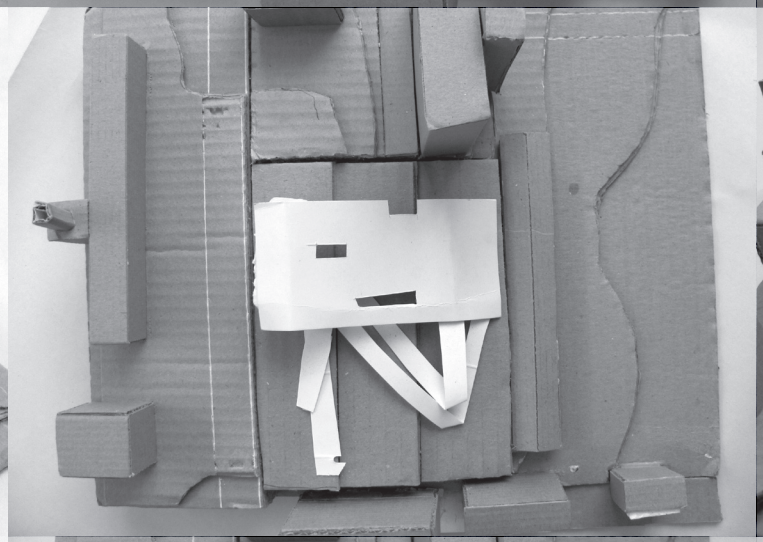
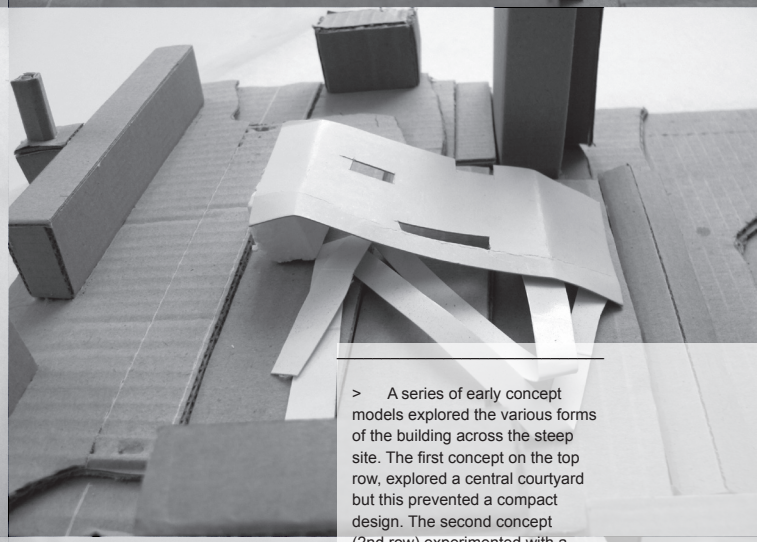
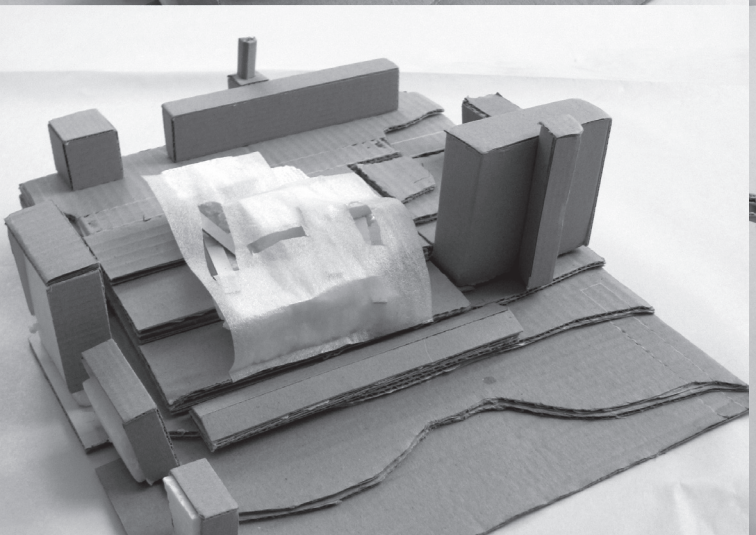
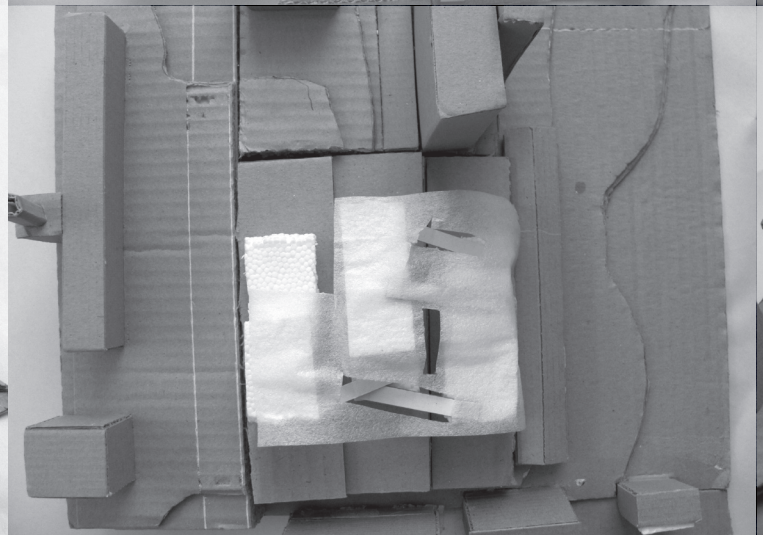
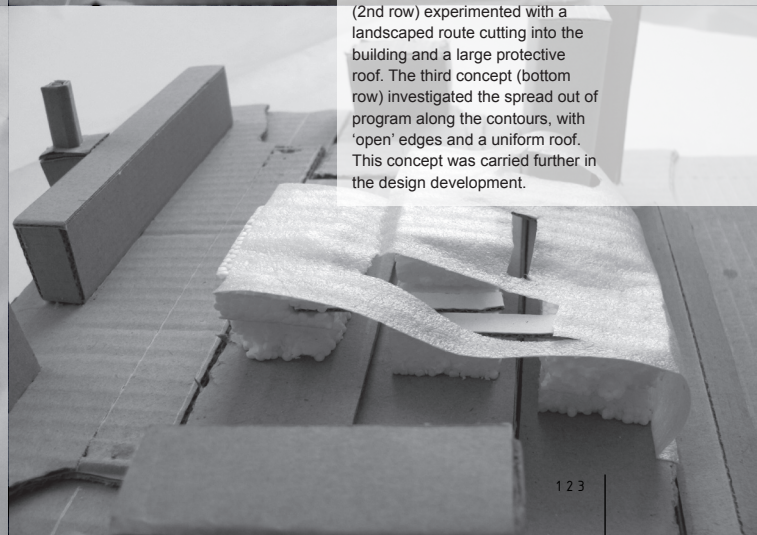


> Conceptual section illustrating the new visual interface and activated retail edges on both ends of the transitional route. These edges form appropriate public interfaces to draw people through the route.

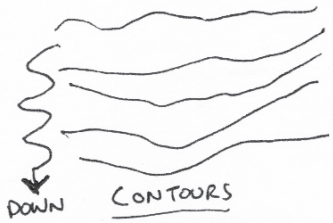
Design Development

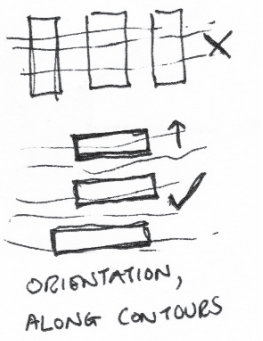
The design development process evolved with the investigation of natural topography treatment/ levels, edge treatments, materials and other design issues. These eventually informed the design and developed as conceptual drivers, including porous edges (with landscape), privacy gradients and visual connections from within and with the building.

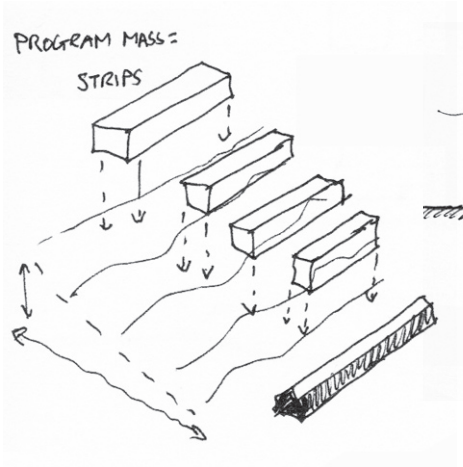


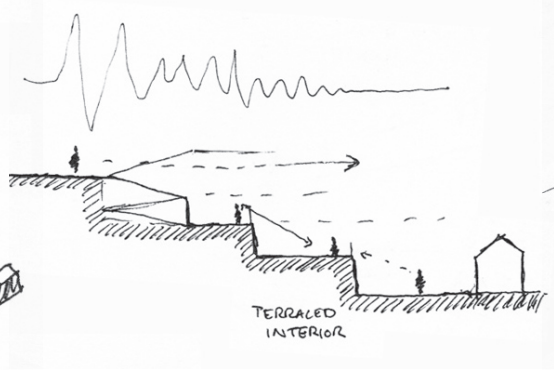










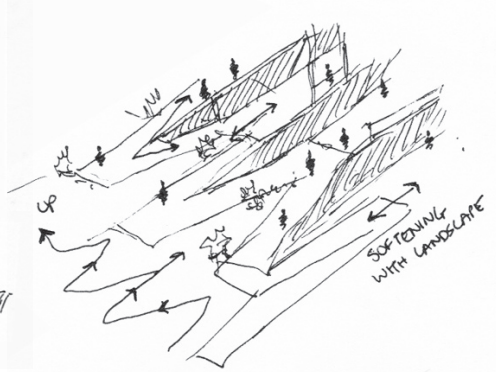
> A series of early concept models explored the various forms of the building across the steep site. The first concept on the top row, explored a central courtyard but this prevented a compact design. The second concept (2nd row) experimented with a landscaped route cutting into the building and a large protective roof. The third concept (bottom row) investigated the spread out of program along the contours, with 'open' edges and a uniform roof. This concept was carried further in the design development.





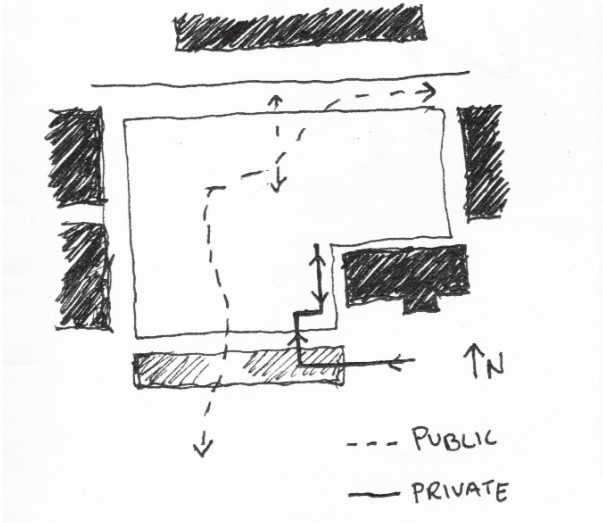






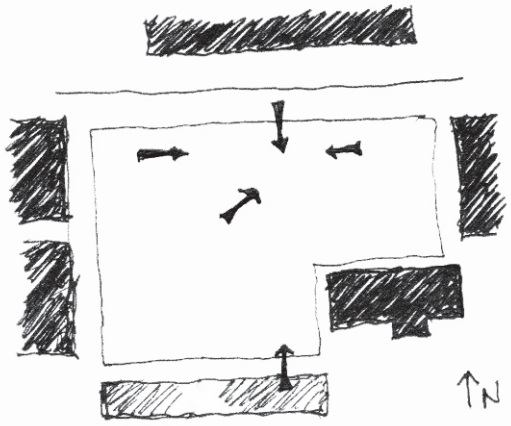
> Treatment of Topography

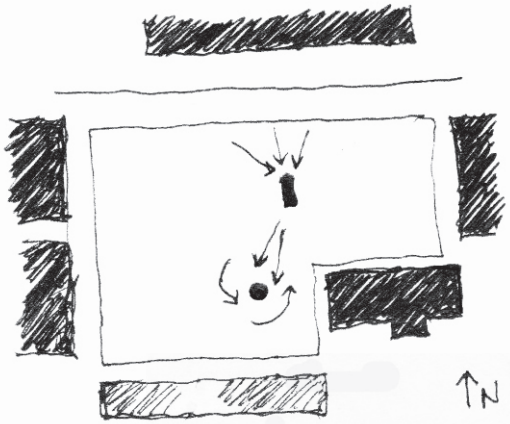
> The site's steep topography was the biggest challenge of the design process. The decision was made to follow the contours and terrace the landscape. The terraced effect allowed for different levels and volumes to be formed, which was softened by the infusion of landscape.

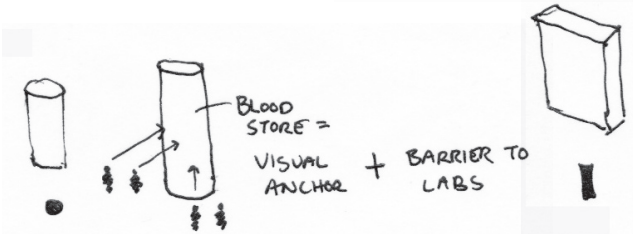


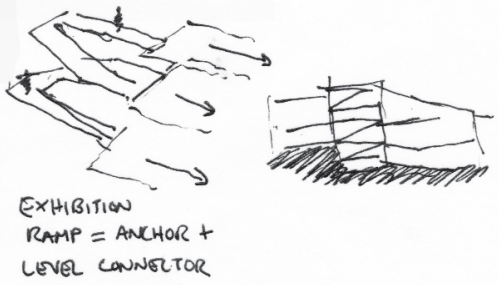
^ General public and private routes

> The established circulation routes as an outcome to site response.



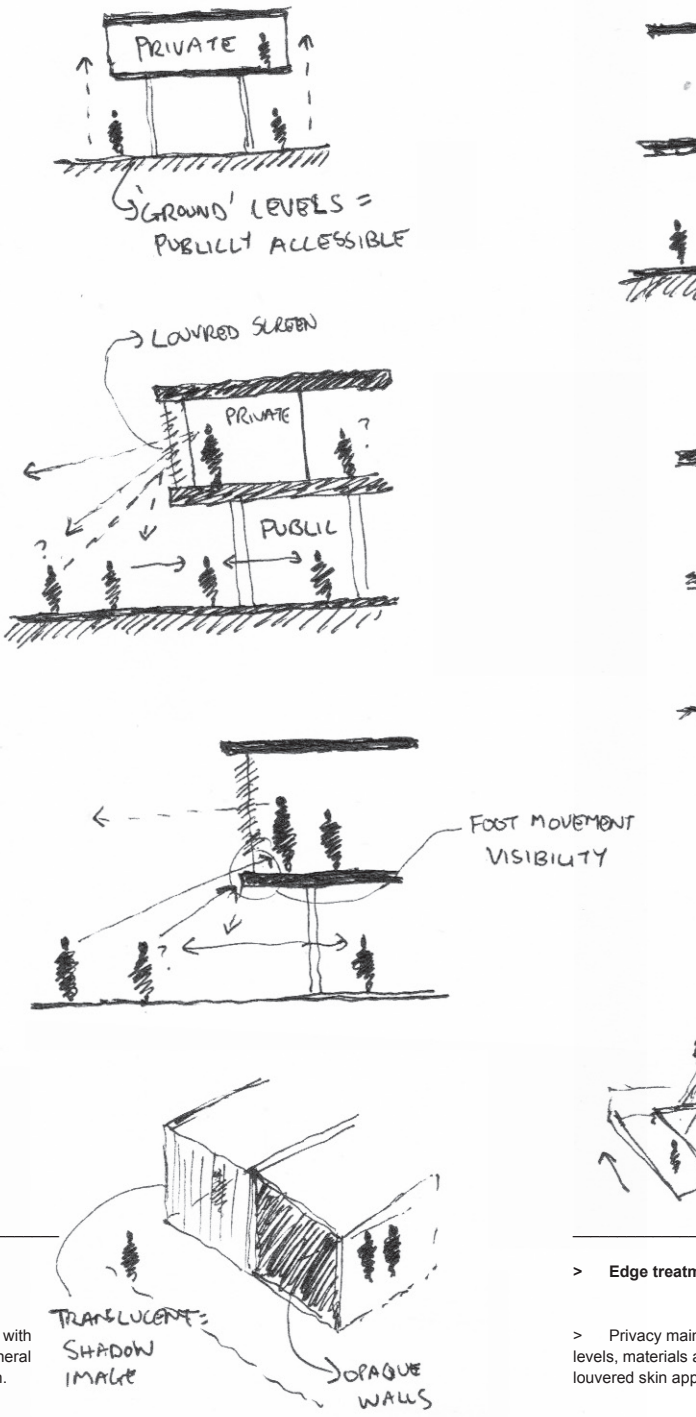






^ Access points into the Hillbrow Biobank

> Visual and physical anchor points in the building.



> Public vs private

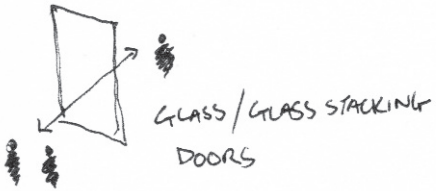
> Privacy maintained with levels, materials and general louvered skin application.

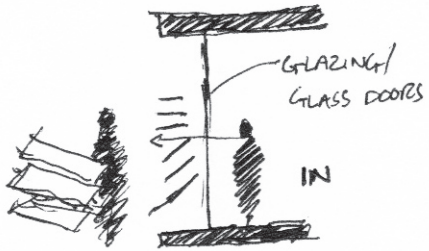
> Edge treatment

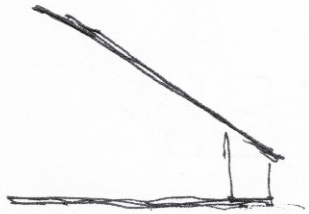
> Privacy maintained with levels, materials and general louvered skin application.

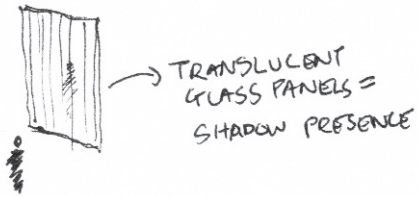
> Establishing visual connections

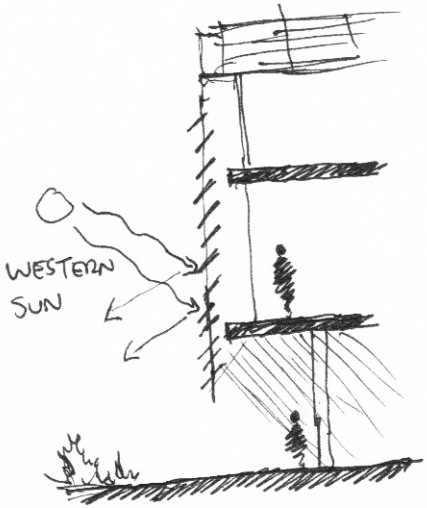
> With landscape, city and with the building.

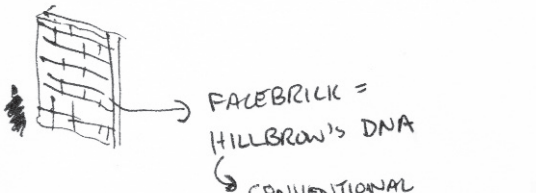


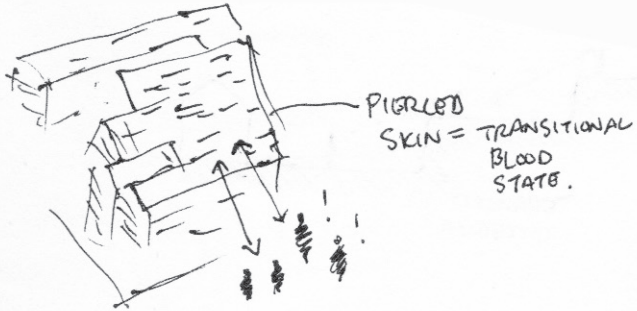


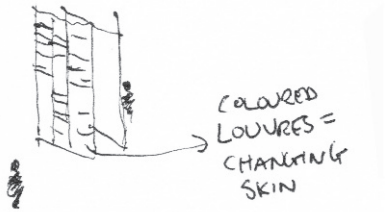


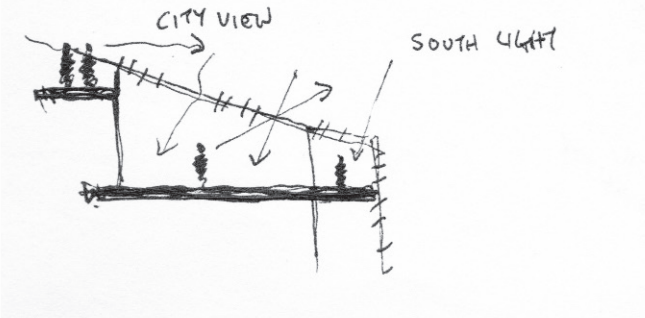












^ Materials

> Materials used are common to the Hillbrow vernacular and create an appropriate and comfortable building which the community can relate to. In contrast, coloured louvres (in shades of red and white) are used as the roof's skin, which bleeds over on certain edges. This creates an identity for the building and simultaneously ensures interior privacy and shading.

^ West shading

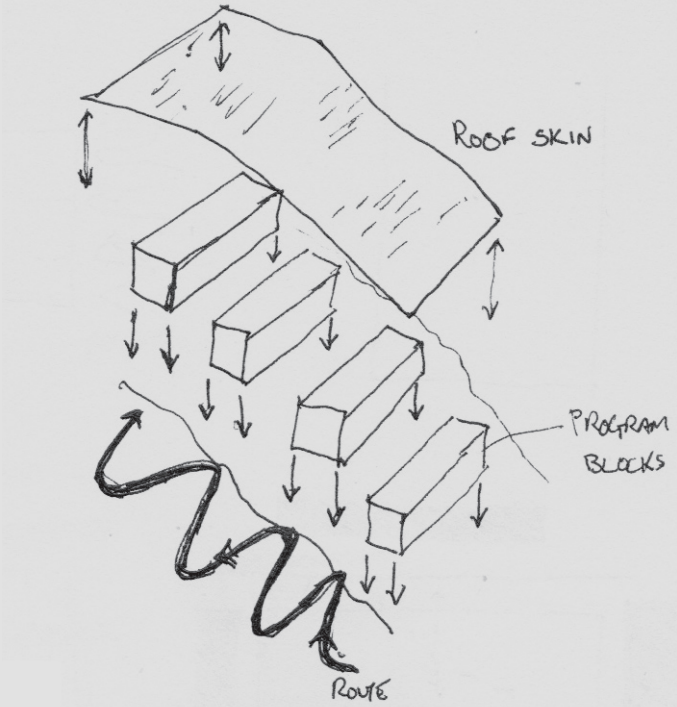
> The western edge of the building is shaded with louvred screens that shield internal floor to ceiling glass panels and doors. These doors can be opened for natural ventilation during the day (especially important when dealing with visitors infected with T.B). The manual adjustment of louvres across the western edge will create an animated surface throughout the day, that reflects ongoing inner activity to those outside.

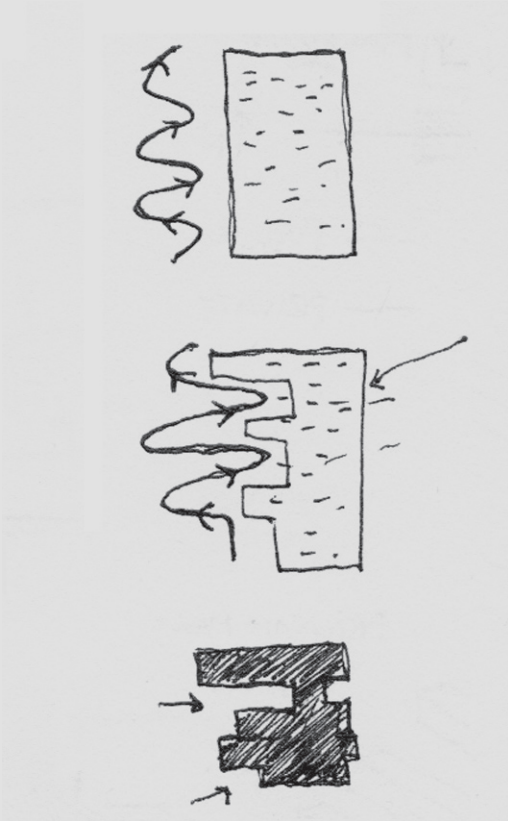
> Roof

> The roof forms the primary visual identity of the Hillbrow Biobank. The roof is also inhabited by the depository, symbolically being protected and offering light and views outwards. The roof is further explored in the pages that follow.

Form Development

The Hillbrow Biobank's form eventually developed as a response to the site and design considerations. The traditional block object is broken through a levelling of programs, porous public edges and a new identity in the roof form.

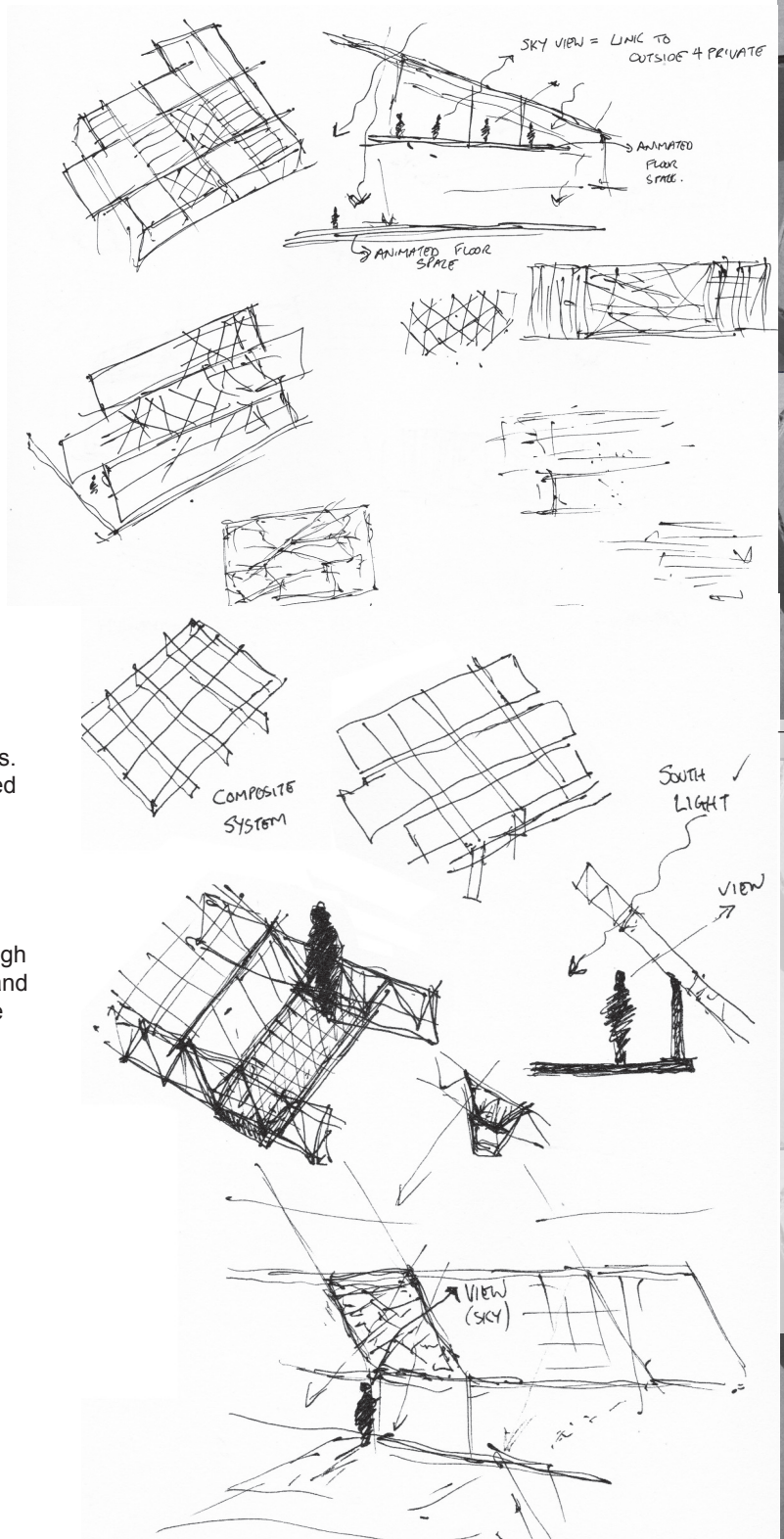


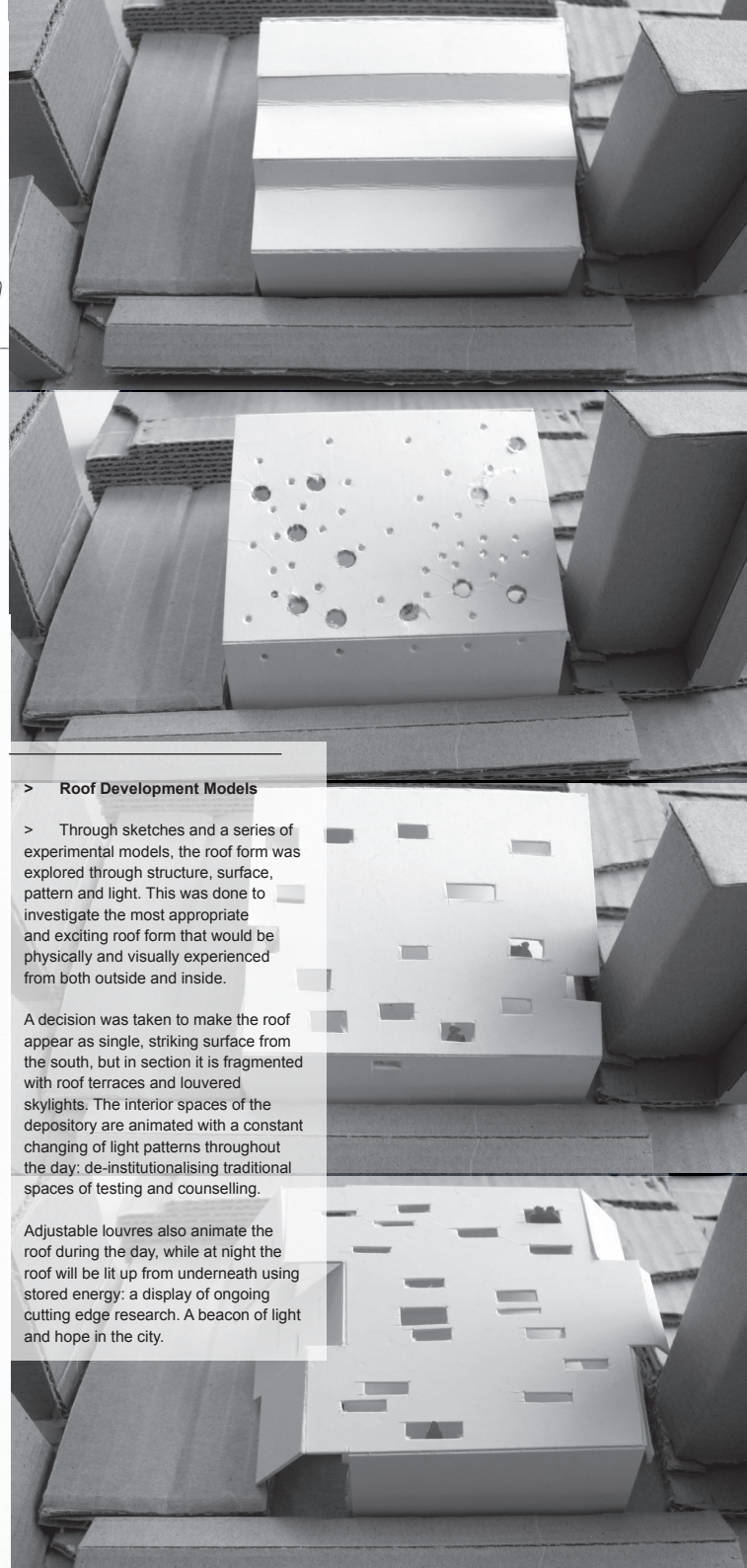


Developing the Roof

The roof form, as the visual identity of the Hillbrow Biobank, is pragmatic and symbolic on various levels. The changing coloured louvres, will form an animated skin that is visible from the south and controls the amount of light in the depository. The louvres can also be adjusted manually in the counselling rooms according to the desired level of privacy.

Symbolically, the changing patterns of the roof through louvre movements alludes to the changing notions and perceptions of blood: from past stigmas of a disease carrier to a new state of information and hope in the genetic age, specifically in an area like Hillbrow that hasn't coped well with disease.



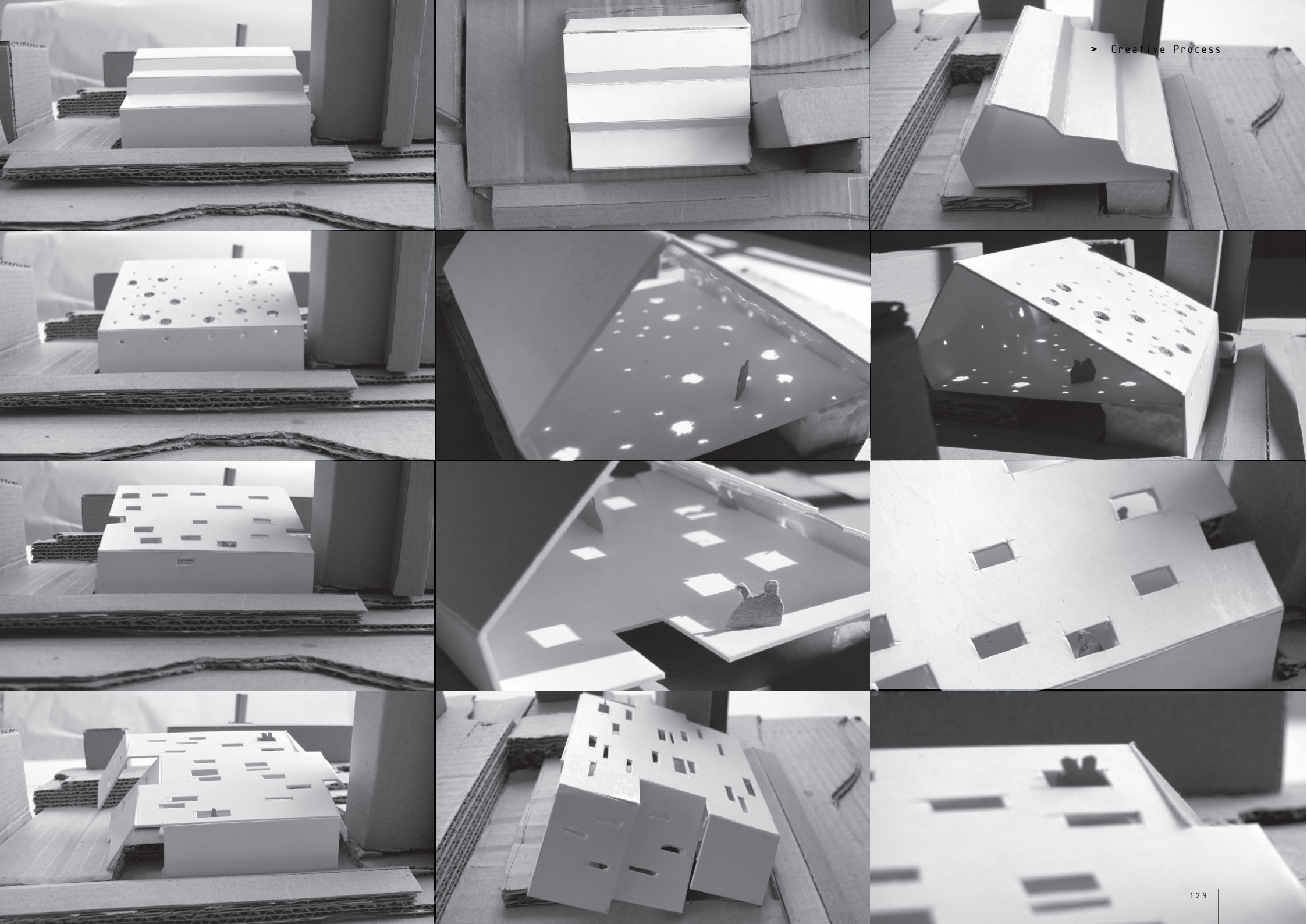


> Roof Development Models

> Through sketches and a series of experimental models, the roof form was explored through structure, surface, pattern and light. This was done to investigate the most appropriate and exciting roof form that would be physically and visually experienced from both outside and inside.

A decision was taken to make the roof appear as single, striking surface from the south, but in section it is fragmented with roof terraces and louvered skylights. The interior spaces of the depository are animated with a constant changing of light patterns throughout the day: de-institutionalising traditional spaces of testing and counselling.

Adjustable louvres also animate the roof during the day, while at night the roof will be lit up from underneath using stored energy: a display of ongoing cutting edge research. A beacon of light and hope in the city.



Technology and Environmental Application

With reference to the biotechnical age, a fusion of natural and artificial systems should be considered and applied to the architectural intervention and its general treatment of the environment. As the Hillbrow Biobank strives for sustained human life through advanced research, it should simultaneously be an example of green architecture that uses environmentally friendly building management systems. The following points have been identified as part of the technological and environmental application:

> An automated HV/AC system is required for a controlled environmental condition for the storage of blood samples at a maintained temperature of -35˚C (i.e. a refrigerated system)[1].

> The same HV/AC system is also needed for the controlled interior conditions of the biobank laboratories, with the appropriate services structure infused in the design in an aesthetically pleasing manner.

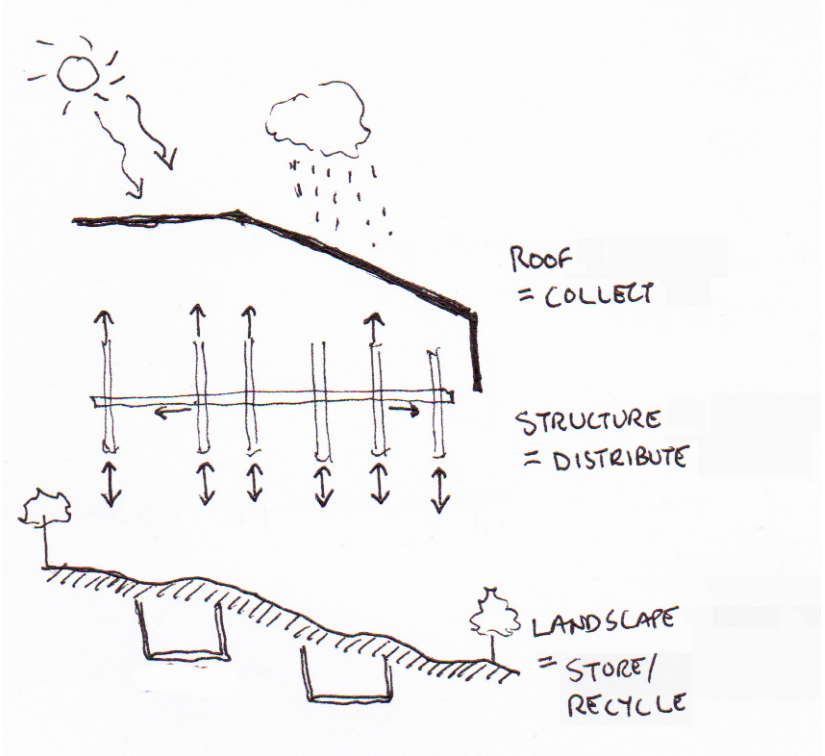
> The HV/AC system will be collaborated with a passive climate control system that conditions the rest of the building and offsets the energy consumption of the blood store and laboratories.

> The roof of the Hillbrow Biobank will be developed functionally and aesthetically like a human skin; layered with various segments and arterials that allow glare-free southern light in, capture solar energy, rainwater and protect the internal environment.

> Interior thermal comfort for visitors will be maintained by a system of solar water heating and cooling throughout the year.

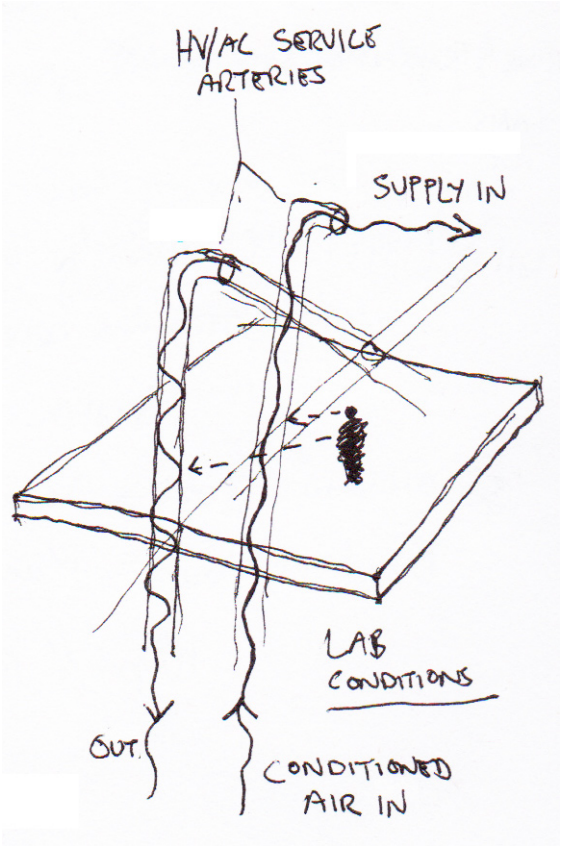
> The natural landscape's mass will also be thermally incorporated into the climate system.

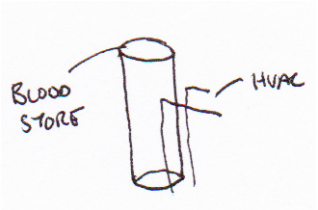
> Use of some of the harvested rainwater for feeding the facility's landscape and community food garden.



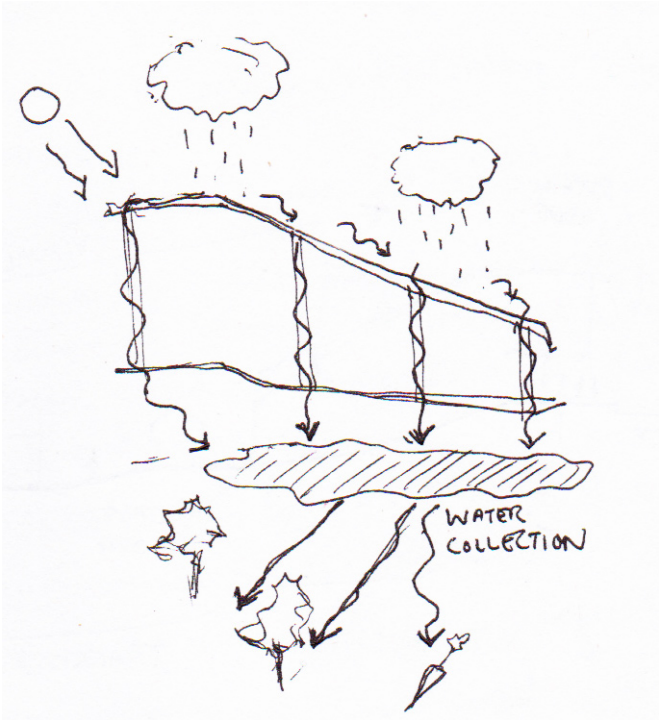
^ Conceptual diagram of building element roles within the passive climate control system.

1 With reference to the "Manual on the Management, Maintenance and Use of Blood Cold Chain Equipment" (please refer to reference list). Also in compliance with SANS OHSAS 18001 Occupational Health and Safety Management System and SANS ISO 9001 Quality Management Systems (http://www.sabs.co.za).

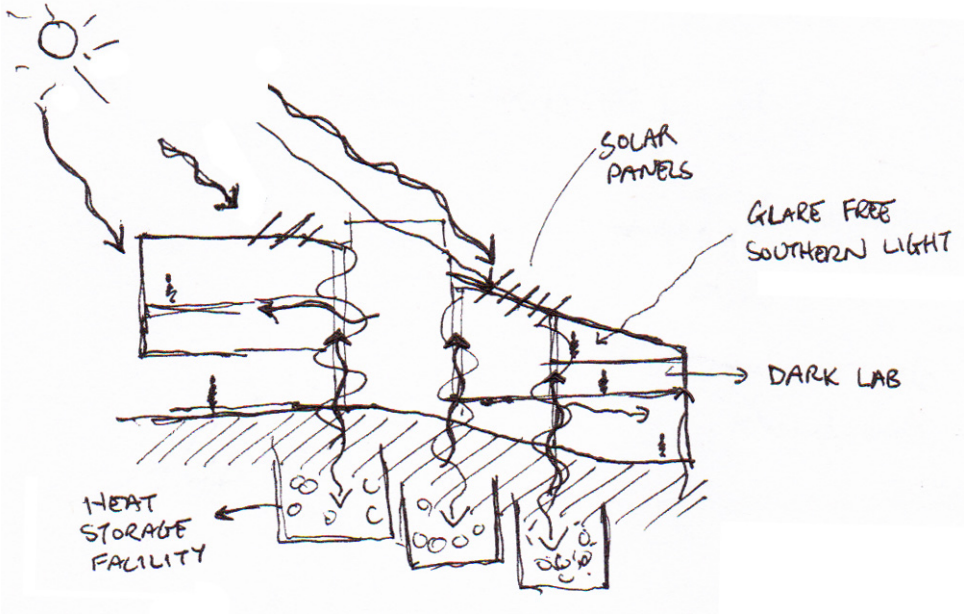




^ Conceptual understanding of the HV/AC system required for the labs; consisting of two major inlet and outlet ducts. These are visibly displayed as the lab's functional arteries: flowing fresh air in and extracting 'old' air out.



> Rainwater is harvested for use in the community food garden and park.



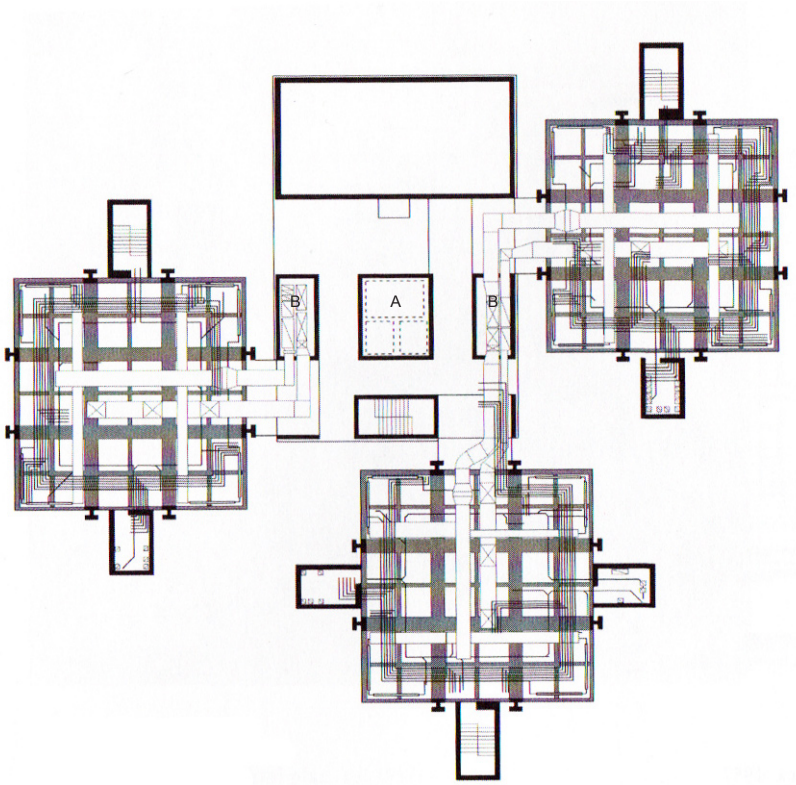
> The roof as a primary element that collects solar energy which is used to operate the laboratory's HV/AC system daily. Energy is distributed through the building's concrete columns and into floor plates or underground storage areas/ plant rooms.

Laboratory Case Study

Richards Medical Research

Laboratories, Philadelphia

Louis Kahn



This building designed by Louis Kahn in 1961 illustrates Kahn's clear understanding of the integration of services with space and construction in an aesthetically pleasing manner. At its time, the facility became a prime example of contemporary laboratory design which was articulate in its expression of structure and service (Leslie 2005: 102).

The laboratories, housed in three towers, are arranged around a nucleus core that houses various services including toilets, stairwells and lift shafts. This nucleus is then expanded with the addition of two smaller towers (supply ducts) on either side that house inlet and outlet HV/AC trunks and service all three laboratory towers. Beneath the nucleus core, on ground level are four "nostril" towers from which air is extracted in (ibid). This air is then ducted upwards to four air-handling units on the roof, from which the conditioned air is directed back down into the supporting supply ducts. Each floor is then supplied with the air through supply trunks that branch off from the main supply air ducts. Exhaust air from the laboratories is expelled through parallel branches, back to the supply ducts and is then sent back for reconditioning (i.e. recycled).

This alludes to a capillary network of vents and ducts and is visibly expressed within the building. These services are also organised into a visible woven pattern in the open ceiling spaces of the laboratories, adding an aesthetically pleasing feature to a traditionally monotonous environment.

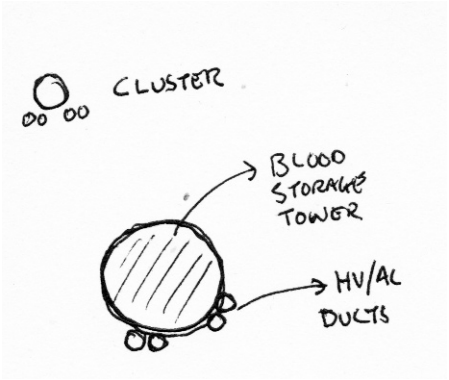
Smaller services towers, which house other services such as water, gas, electricity etc. are also placed on the periphery of the laboratory towers and expressed as vertical features in the design. Khan's ingenious handling and organization of laboratory services, in the form of a capillary network, can form a basis for the technical resolution of the HV/AC system within the Hillbrow Biobank.

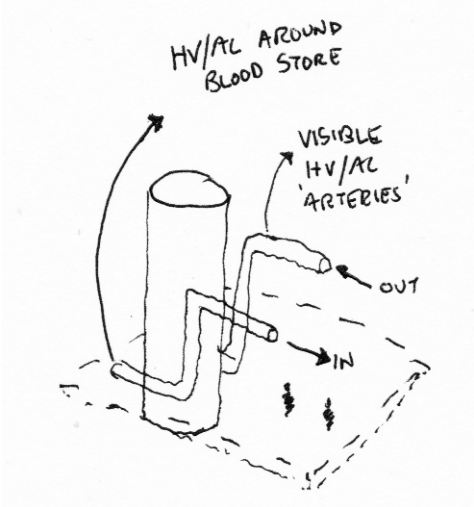
> Above: the capillary HV/AC network organised as a woven fabric. Note the nucleus core (A) and supply ducts (B).

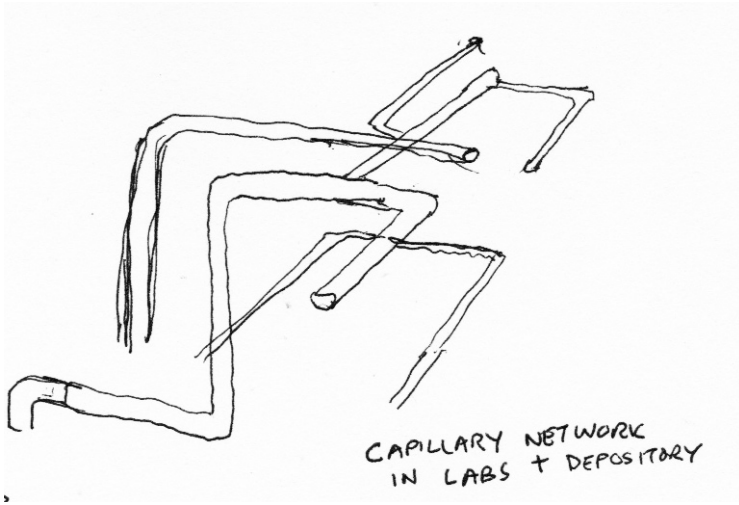
Right: Interior view of a laboratory with exposed ceiling services.

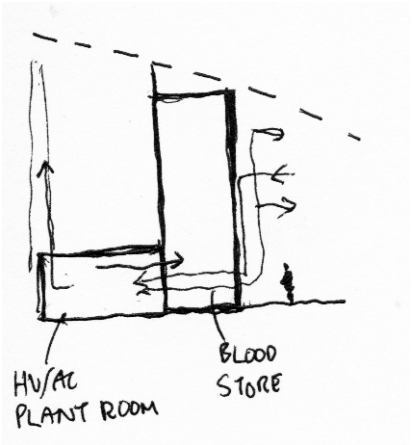
(Leslie: 2005)

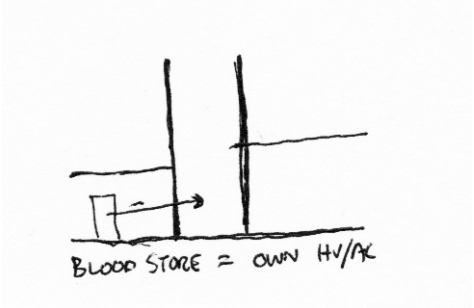
> Further conceptual development of the HV/AC system as part of design: visually expressed as a capillary network.

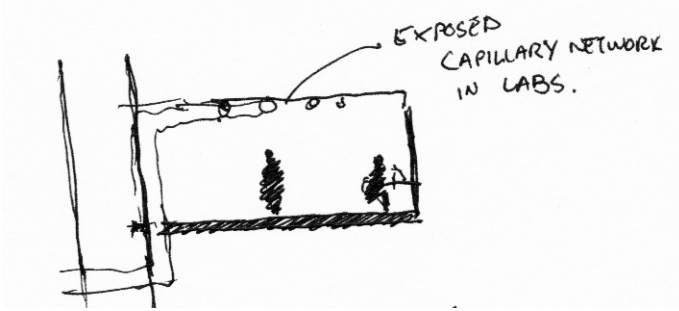






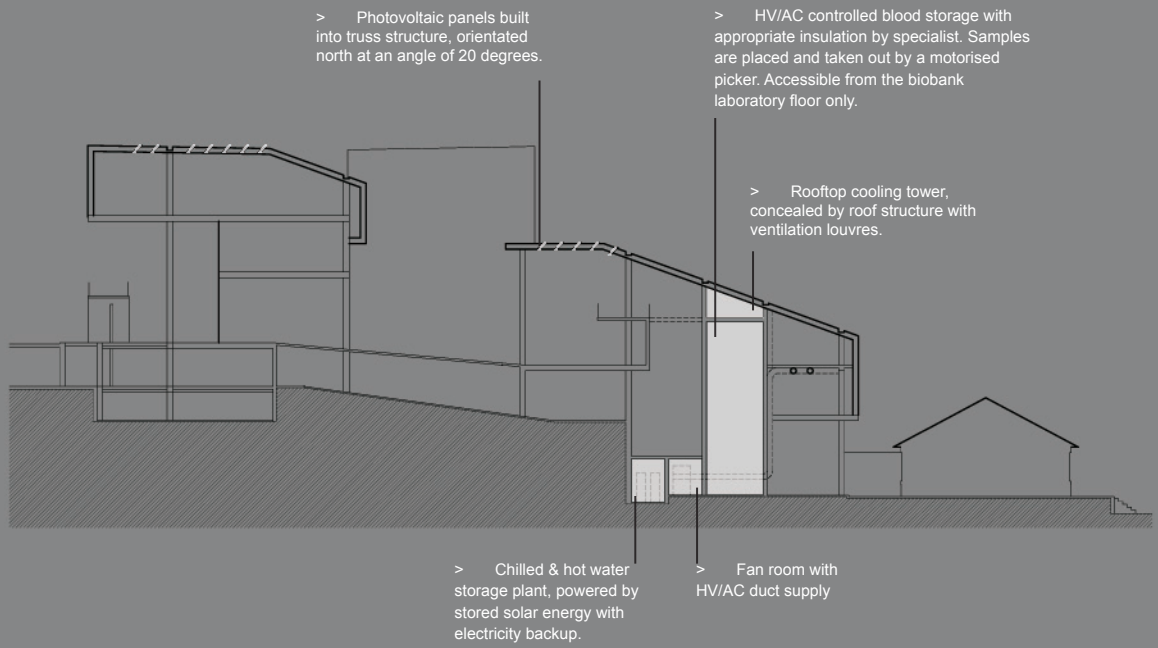






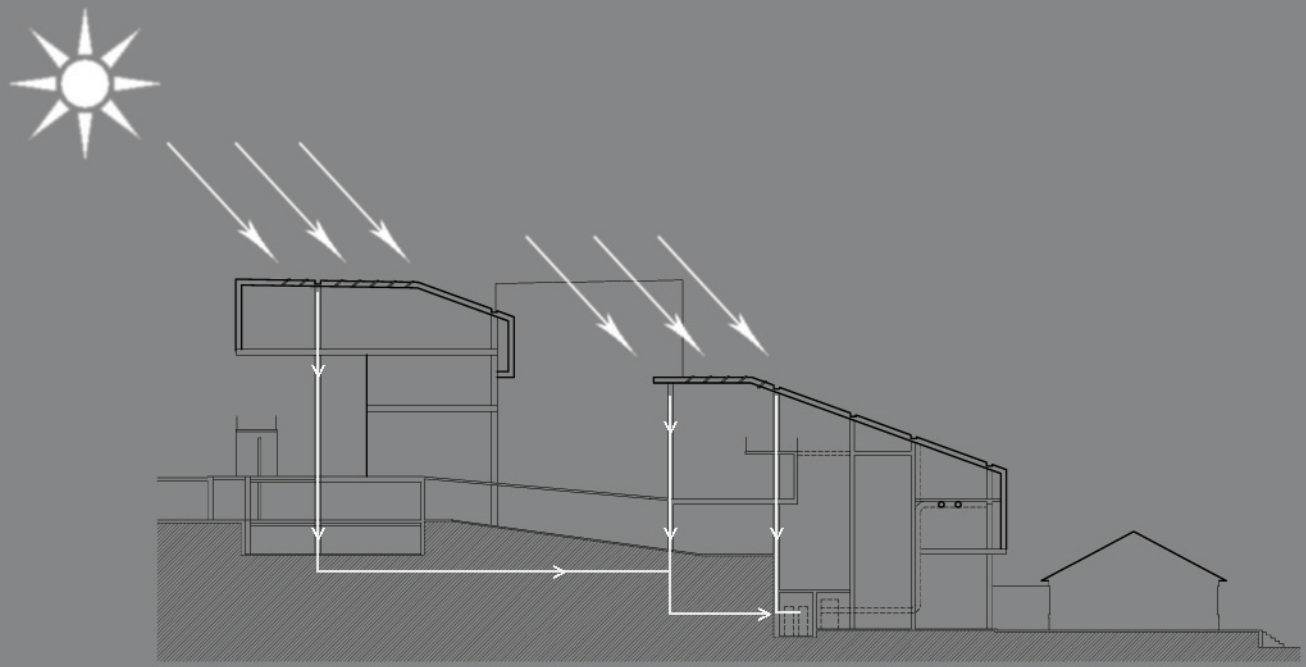
> **HV/AC System Layout**
(conceptual section)

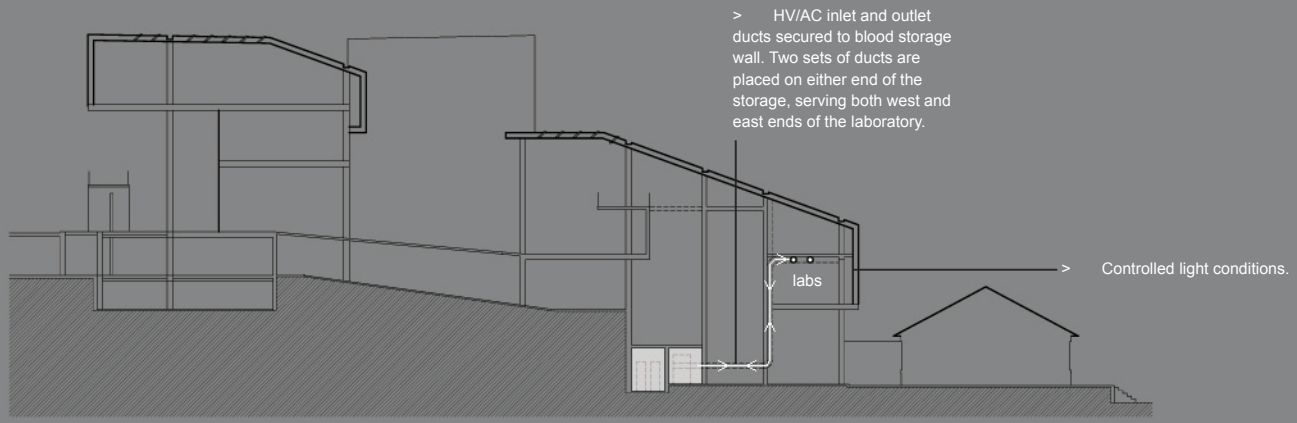
This section illustrates the various positions of plant rooms in the building, in relation to the building's concrete frame structure which is the distributive element.



> **Solar Energy Harvested**

Energy captured from the roof will be distributed down and stored for use in the HV/AC plant rooms. An electricity backup will also be in place for overcast days.



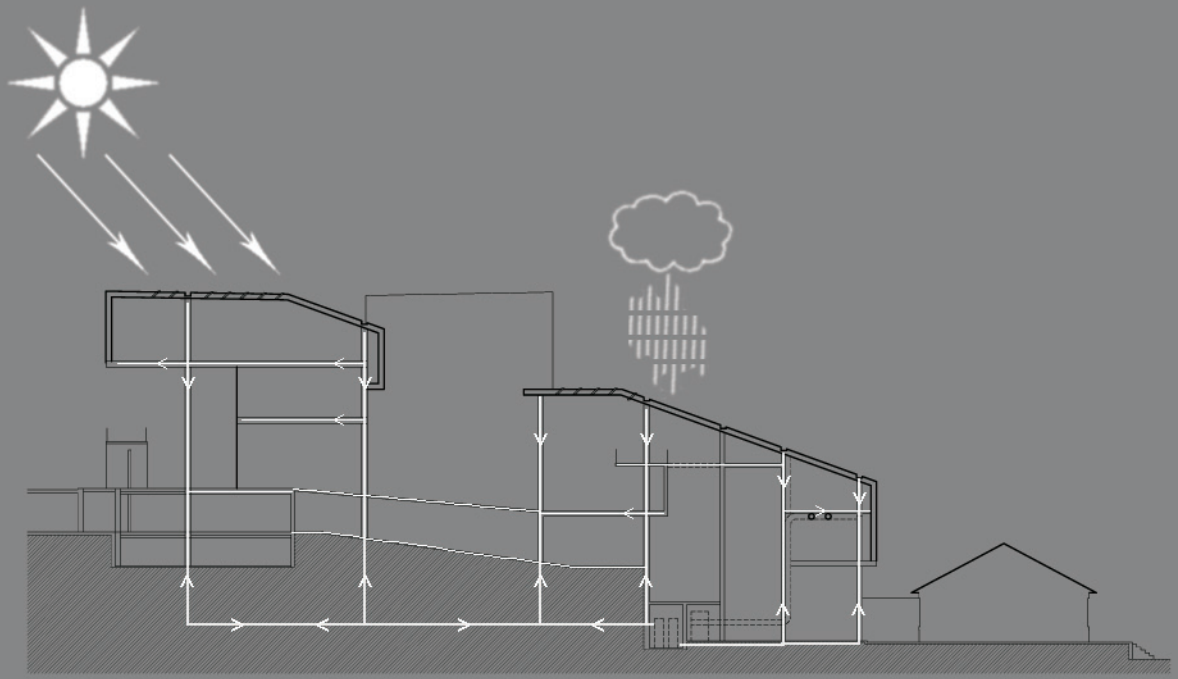


> HV/AC inlet and outlet ducts secured to blood storage wall. Two sets of ducts are placed on either end of the storage, serving both west and east ends of the laboratory.

> Controlled light conditions.

< **HV/AC Duct System**

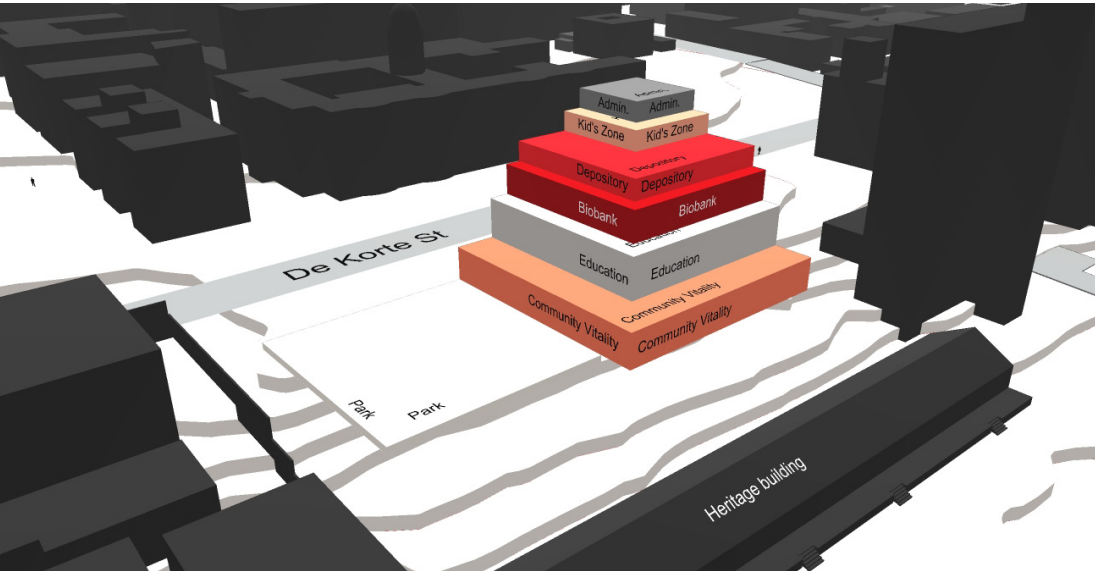
Conditioned air is taken into the lab while simultaneously, exhaust air is taken back to the plant for recycling and redistribution. These ducts are visible to both researchers, laboratory visitors and donors on the top depository level.



< **Passive Climate Control**

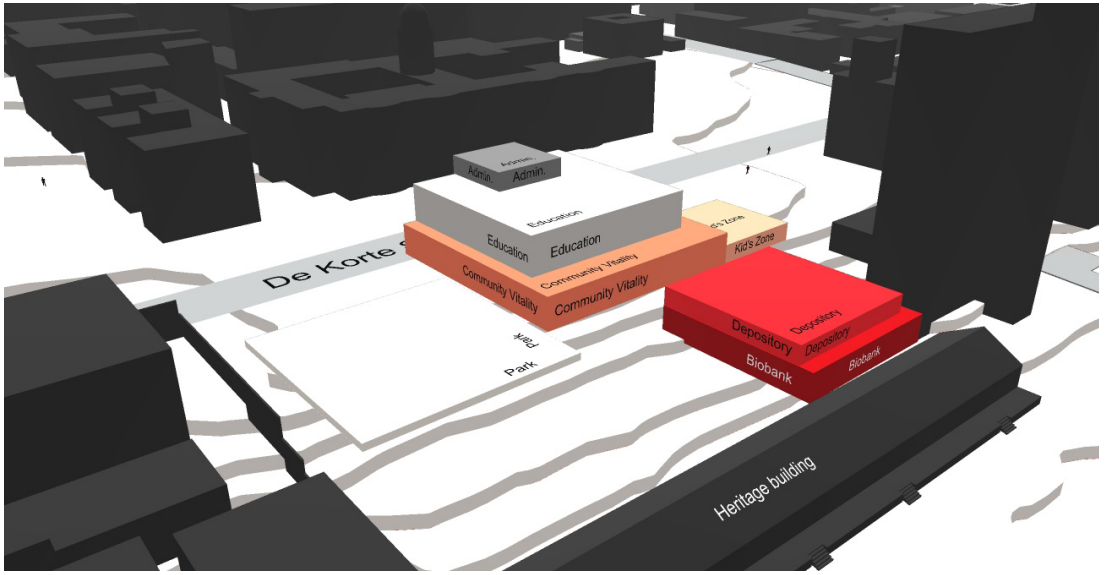
The rest of the building's internal environment is controlled with an under floor heating and cooling water-based system, conditioned with harvested energy.

Massing the Program on Site



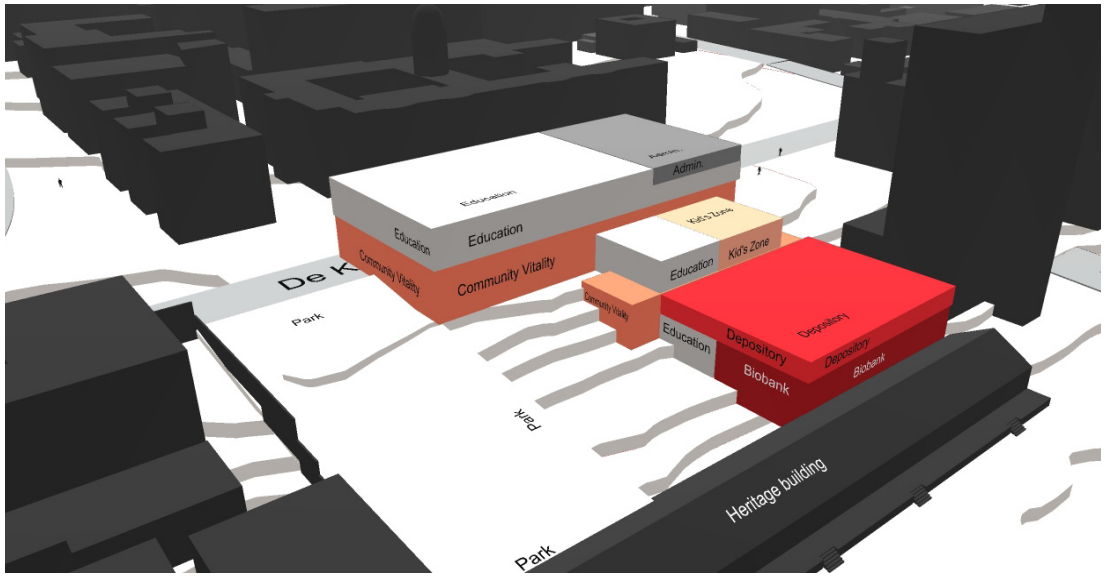
^ General Stacking of Program Masses

> The programs are stacked on top of each other on the site, to understand the proportional relationships of the programmatic hybrid.



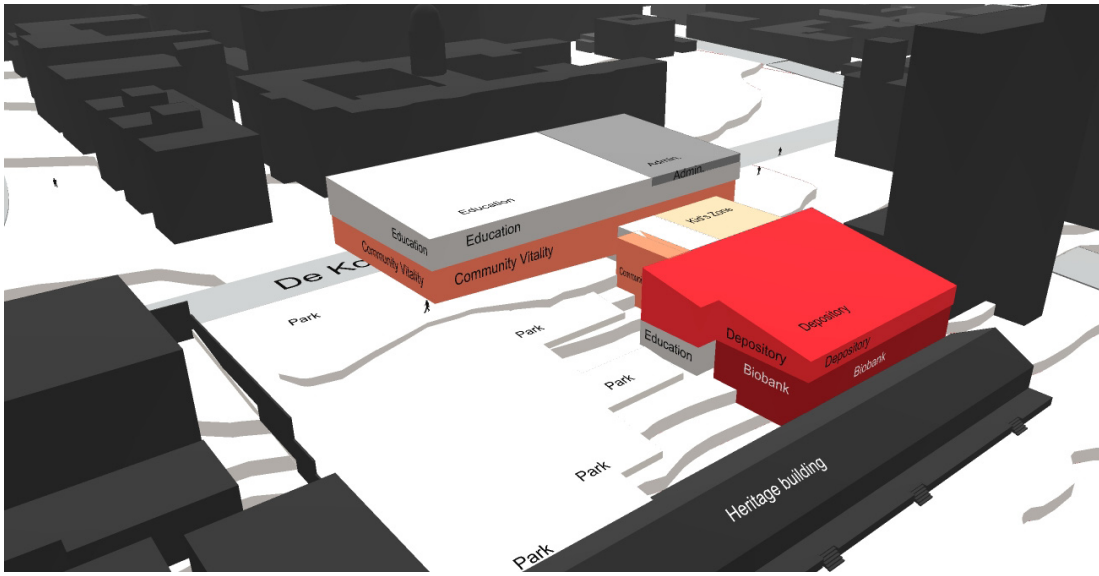
^ Emphasising the Transitional Route

> The programs are then arranged according to the established transitional route/ privacy gradient, before it is shaped.



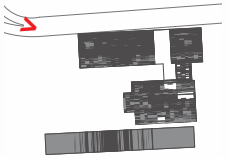
^ **Shaping the Mass**

> Dividing and shaping the mass according to program links and arranged along the decline of the site. The western edge is also activated with public programmed spaces that will address the pedestrian thoroughfare through the site.



^ **Preliminary Development of Form**

> The shaped mass is developed further with the landscape and with regards to the desired roof form. Parts of the western and northern edges of the mass are lifted up, developing 'open' edges of the building.



> **Arrival on De Korte St**

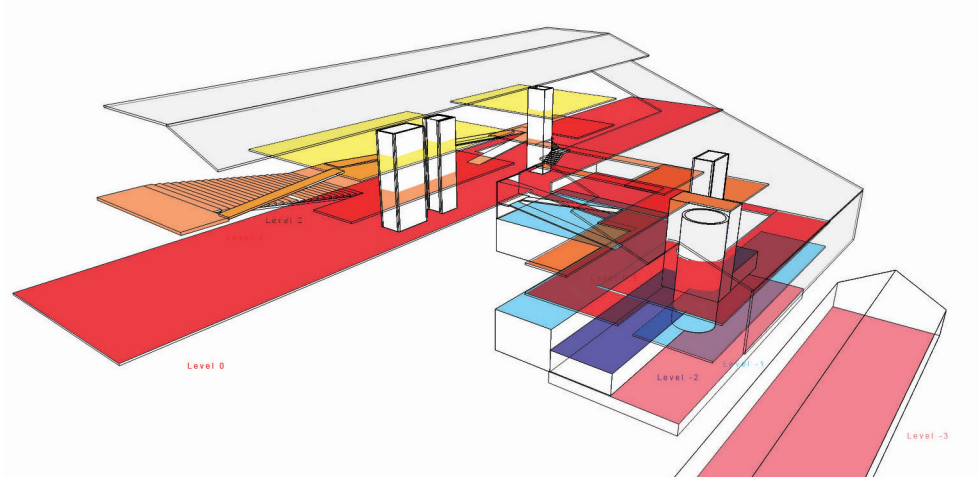
North west perspective from the corner of De Korte Street. The cantilevered auditorium is a corner focal point for traffic passing by. The edge of the building is also lifted up and ramped, allowing for easy pedestrian access.

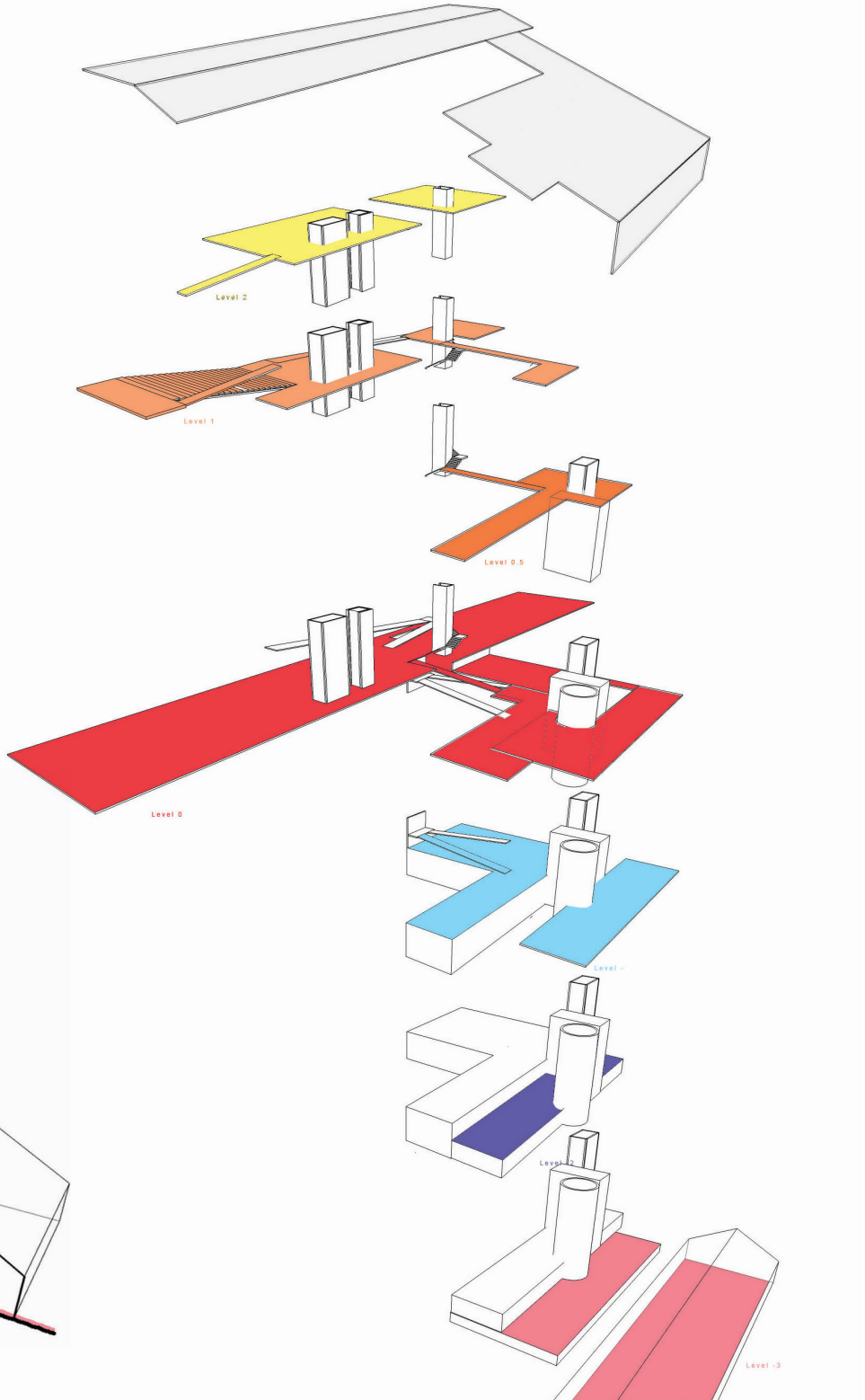
The Hillbrow Biobank

^
N

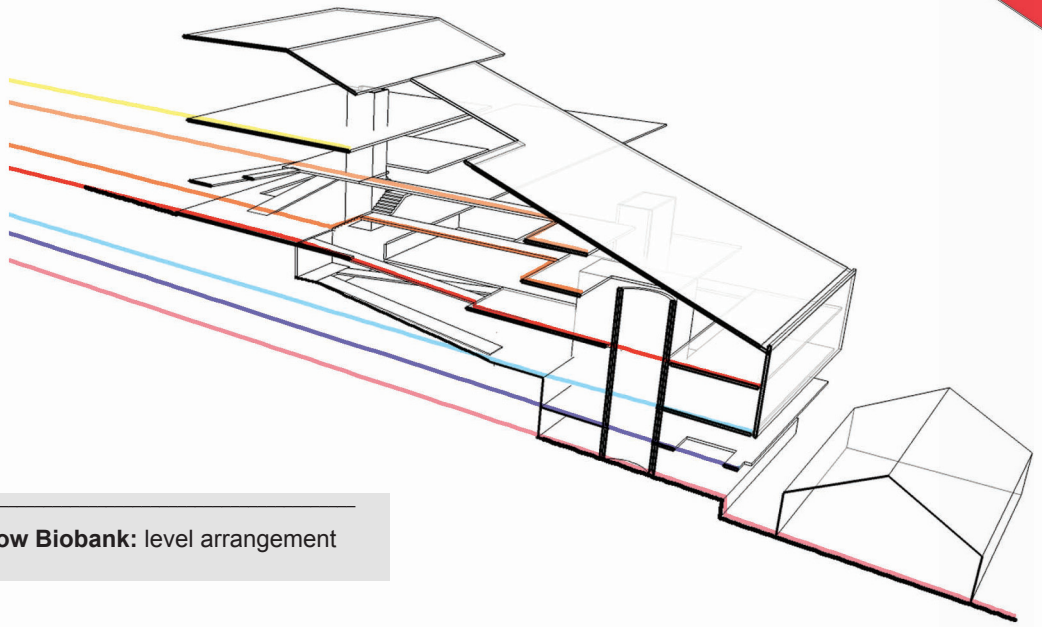
Context Plan


> The Hillbrow Biobank
Joubert St
De Korte St
Hospital St
Risik St
Smit St
N
Site Plan

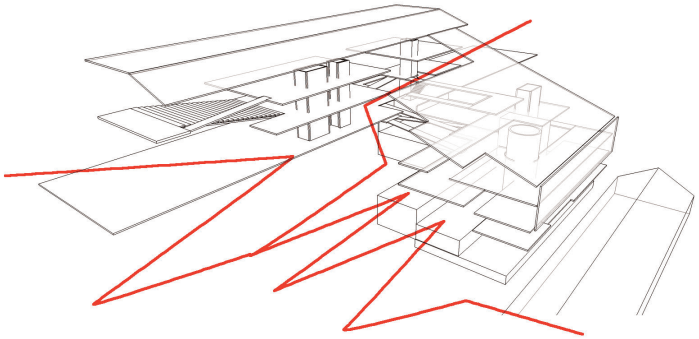




2
1
0.5
level 0 (street level)
-1
-2
-3

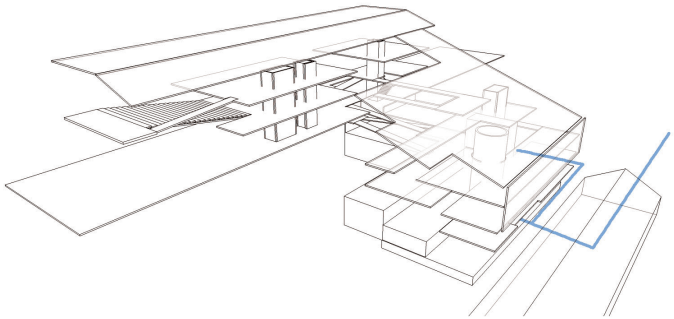


> **Hillbrow Biobank:** level arrangement



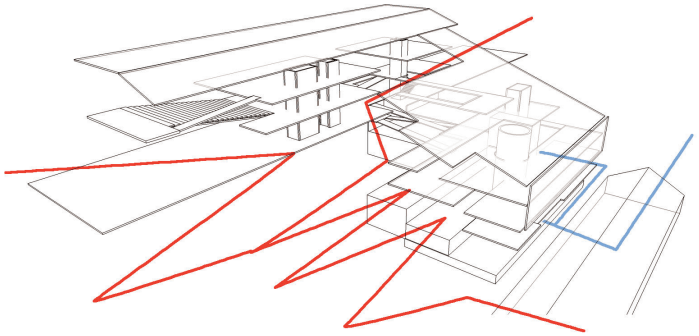
^ **Public Edges**

> Western edges (park) and northern street edge

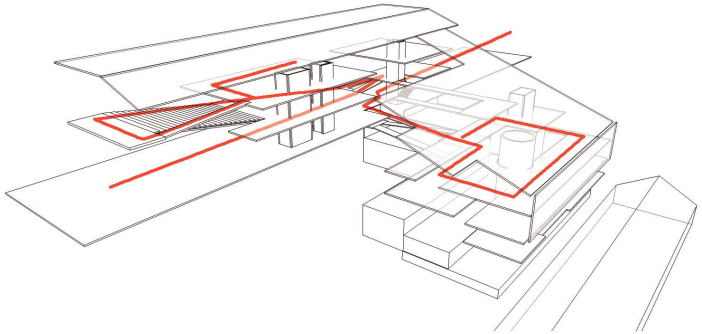


^ **Private Edges**

> Southern edge (including existing heritage building)

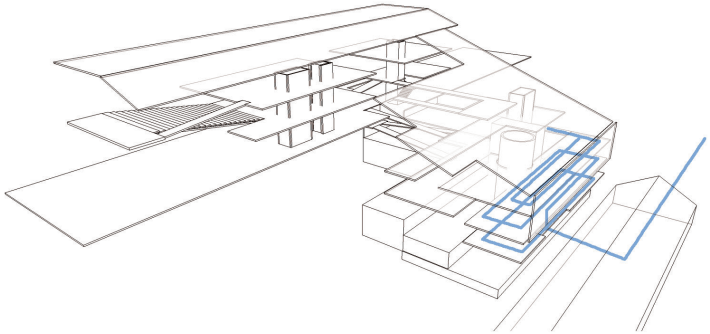


< **Public vs Private edges**



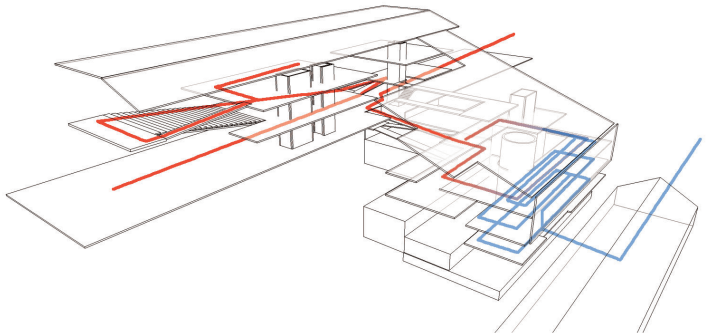
^ **Public Artery**

> Street/urban energy in

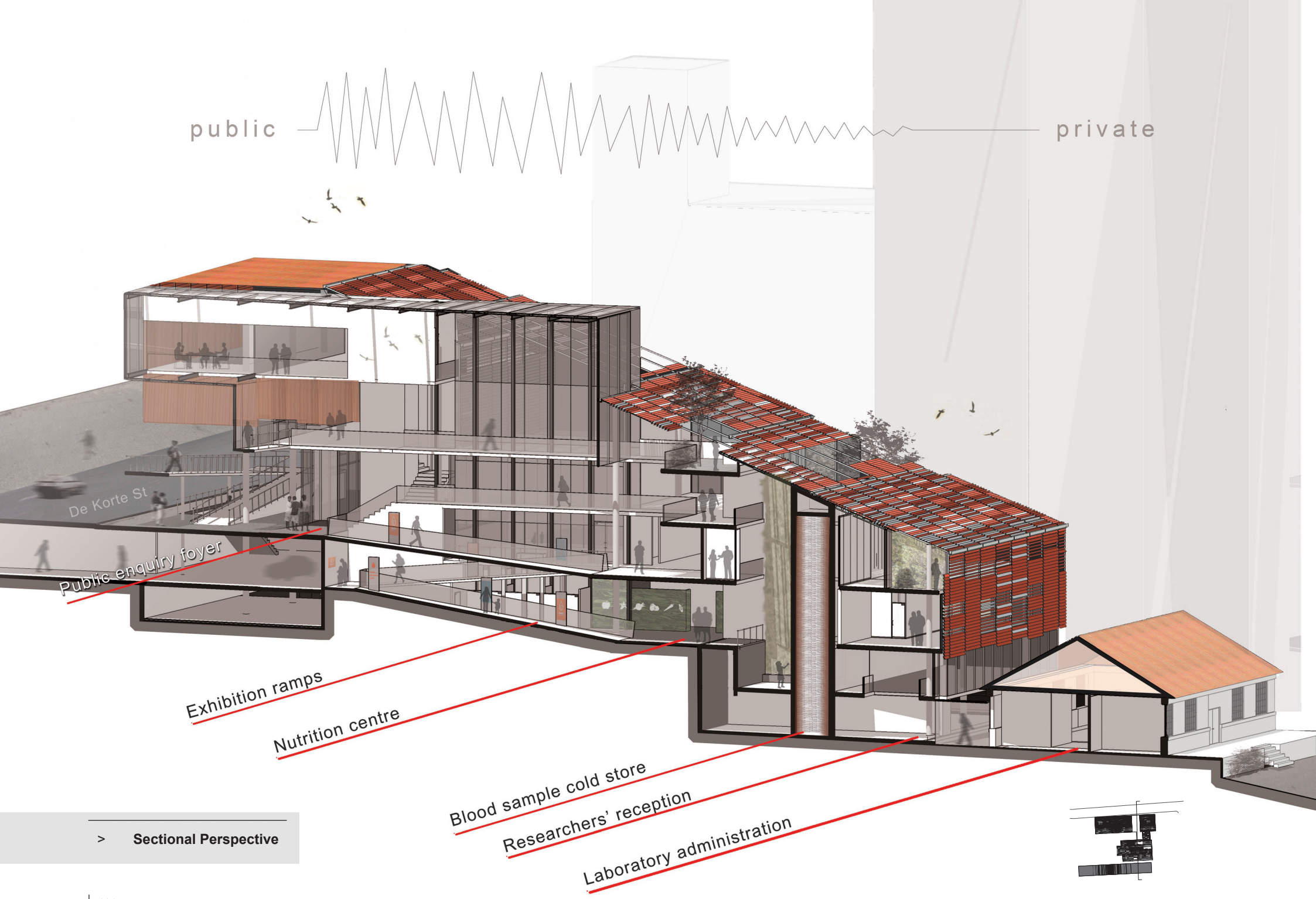


^ **Private Artery**

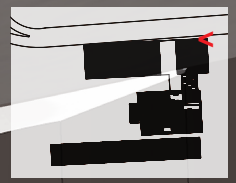
> Secure and controlled (sterile conditions): researchers' entry



< **Public vs Private movement**

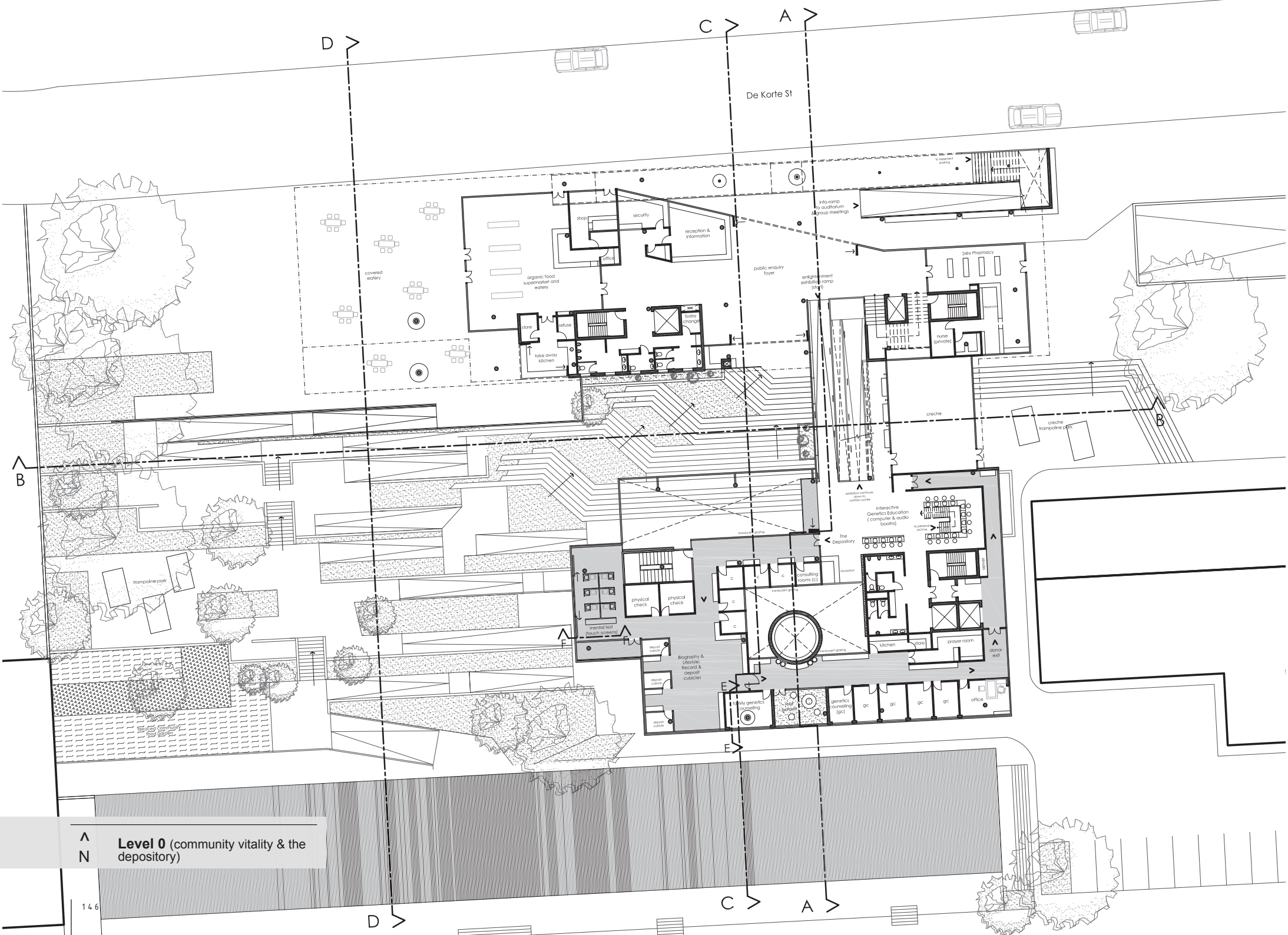


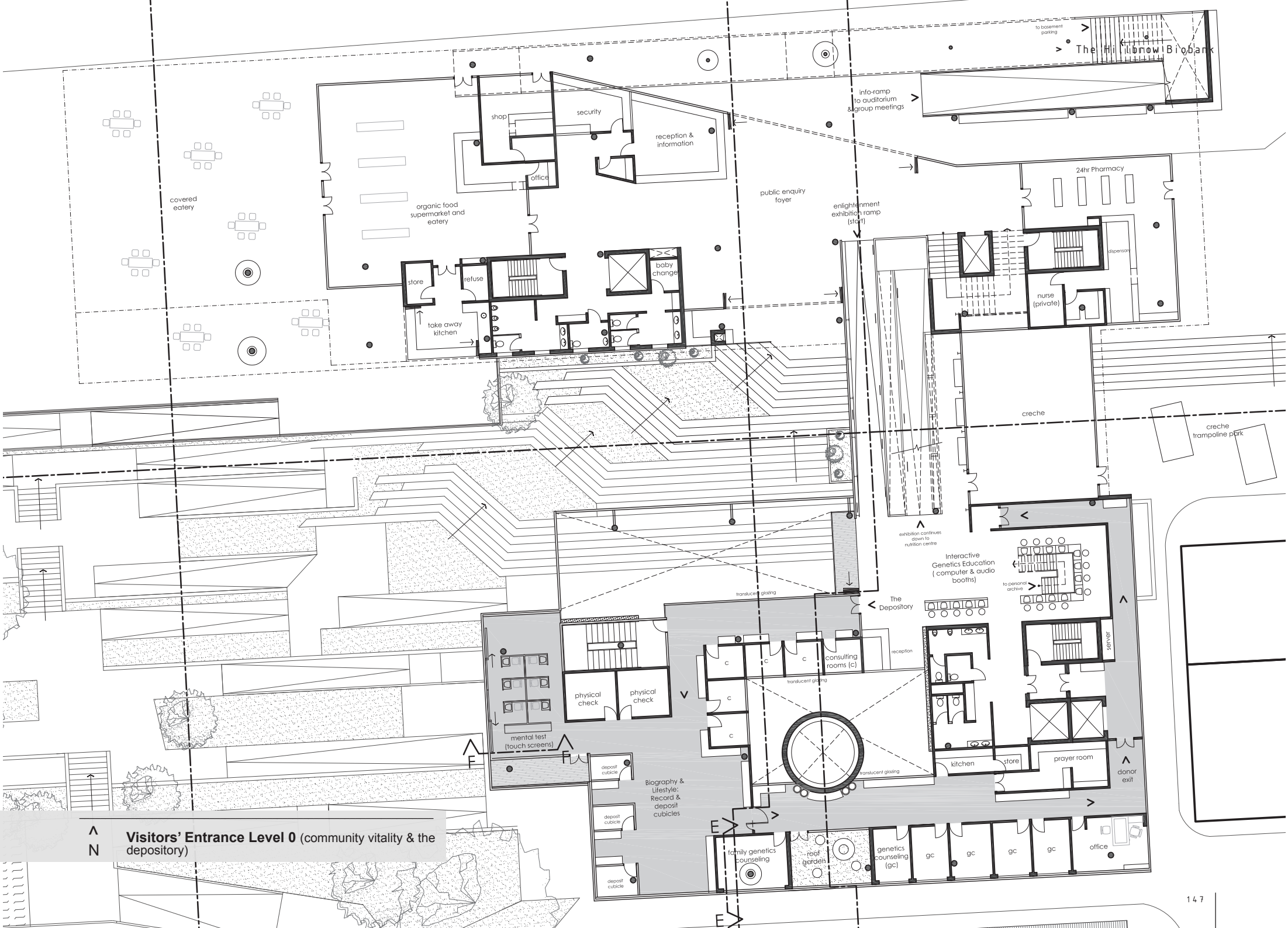
> **Sectional Perspective**



> '**Information on the Go**'

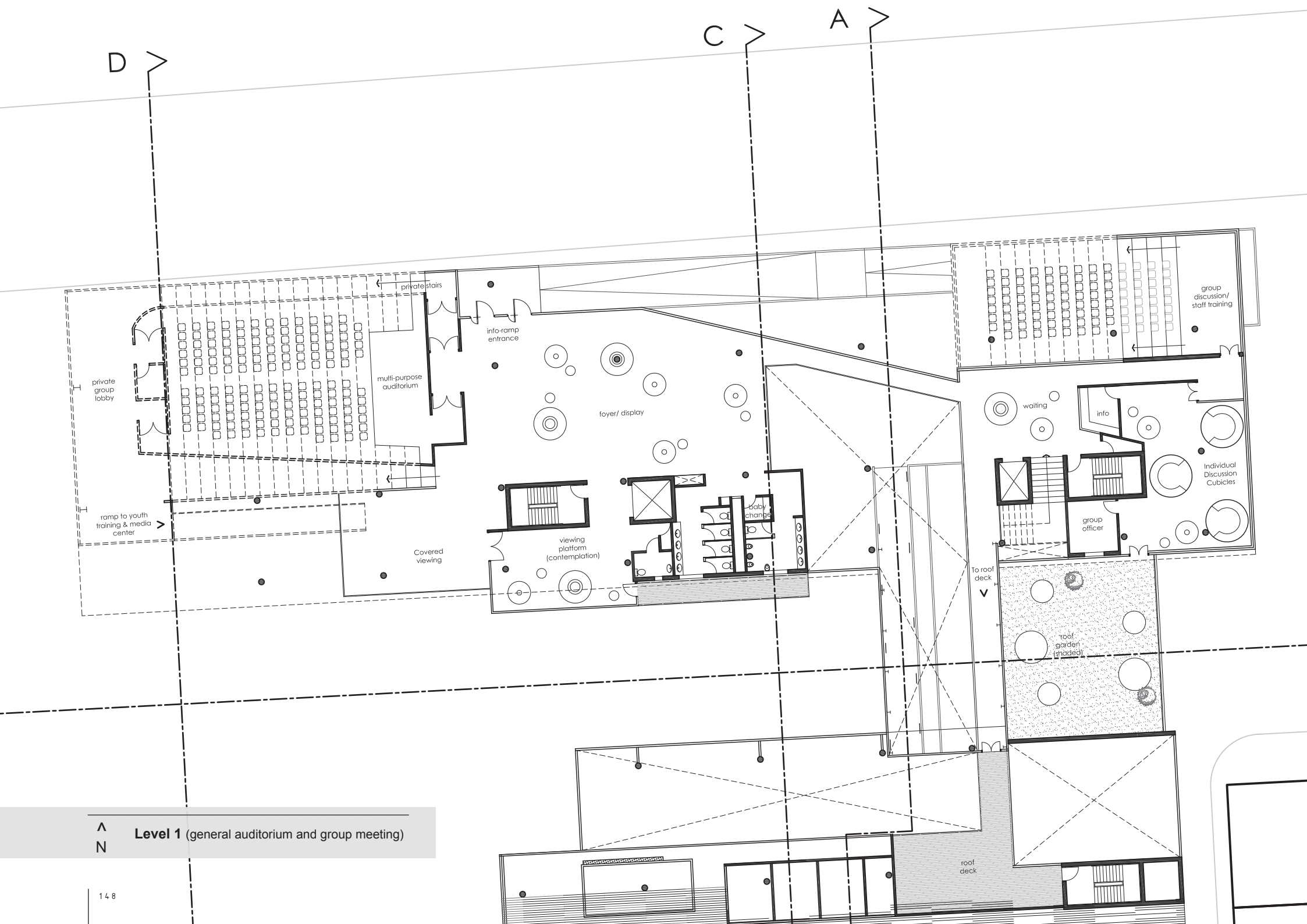
During public film screenings and talks in the auditorium, visitors are drawn up the info-ramp, an extension of De Korte Street. As one moves up along the ramp, health information is displayed on LED screens 'underneath' the building in multiple languages and symbols. Visitors can then ask one of the health workers for further information on a specific subject that had caught their attention.


De Korte St
A
B
C
D
E
F
covered eatery
organic food supermarket and eatery
shop
security
reception & information
offices
public enquiry foyer
info-ramp to auditorium & group meetings
to basement parking
24hr Pharmacy
store
refuse
baby change
take away kitchen
nurse (private)
creche
creche trampoline park
trampoline park
Interactive Genetics Education (computer & audio booths)
The Depository
translucent glazing
physical check
physical check
mental test (touch screens)
consulting rooms (c)
reception
kitchen
store
prayer room
donor exit
Biography & Litestyle Record & deposit cubicles
deposit cubicle
family genetics counselling
rest toilets
genetic counselling (gc)
office
Level 0 (community vitality & the depository)



N

Visitors' Entrance Level 0 (community vitality & the depository)



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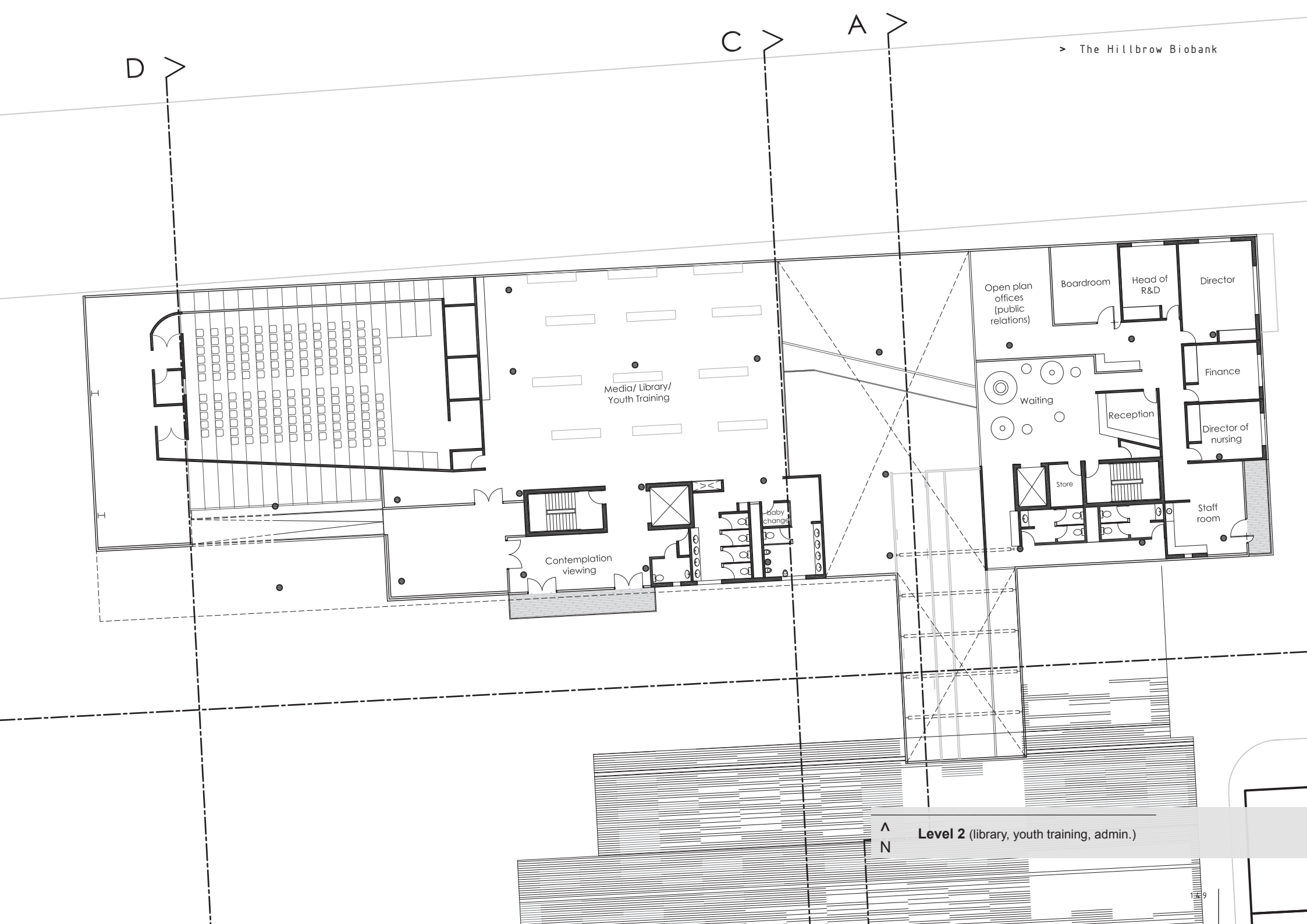
Level 1 (general auditorium and group meeting)



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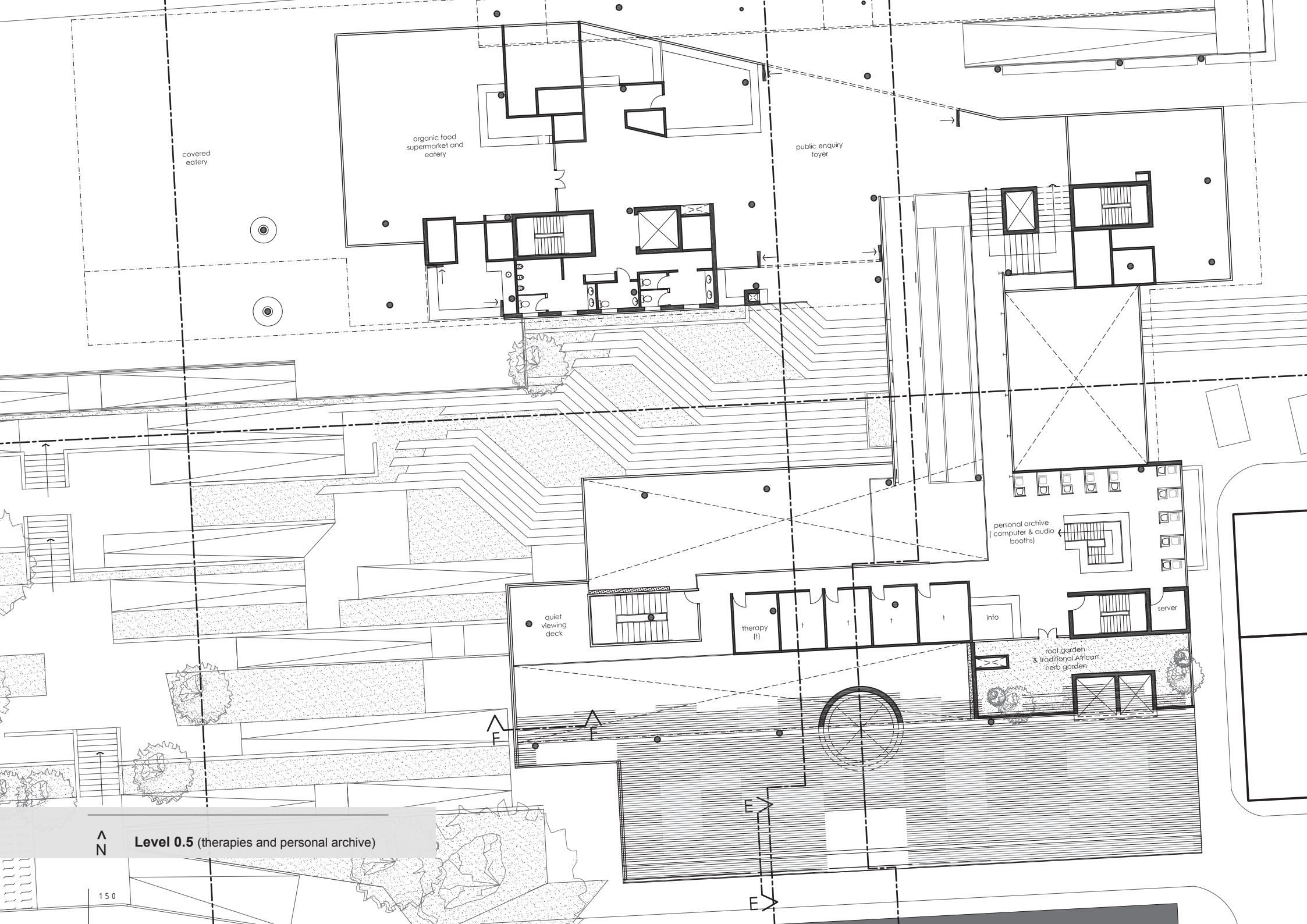
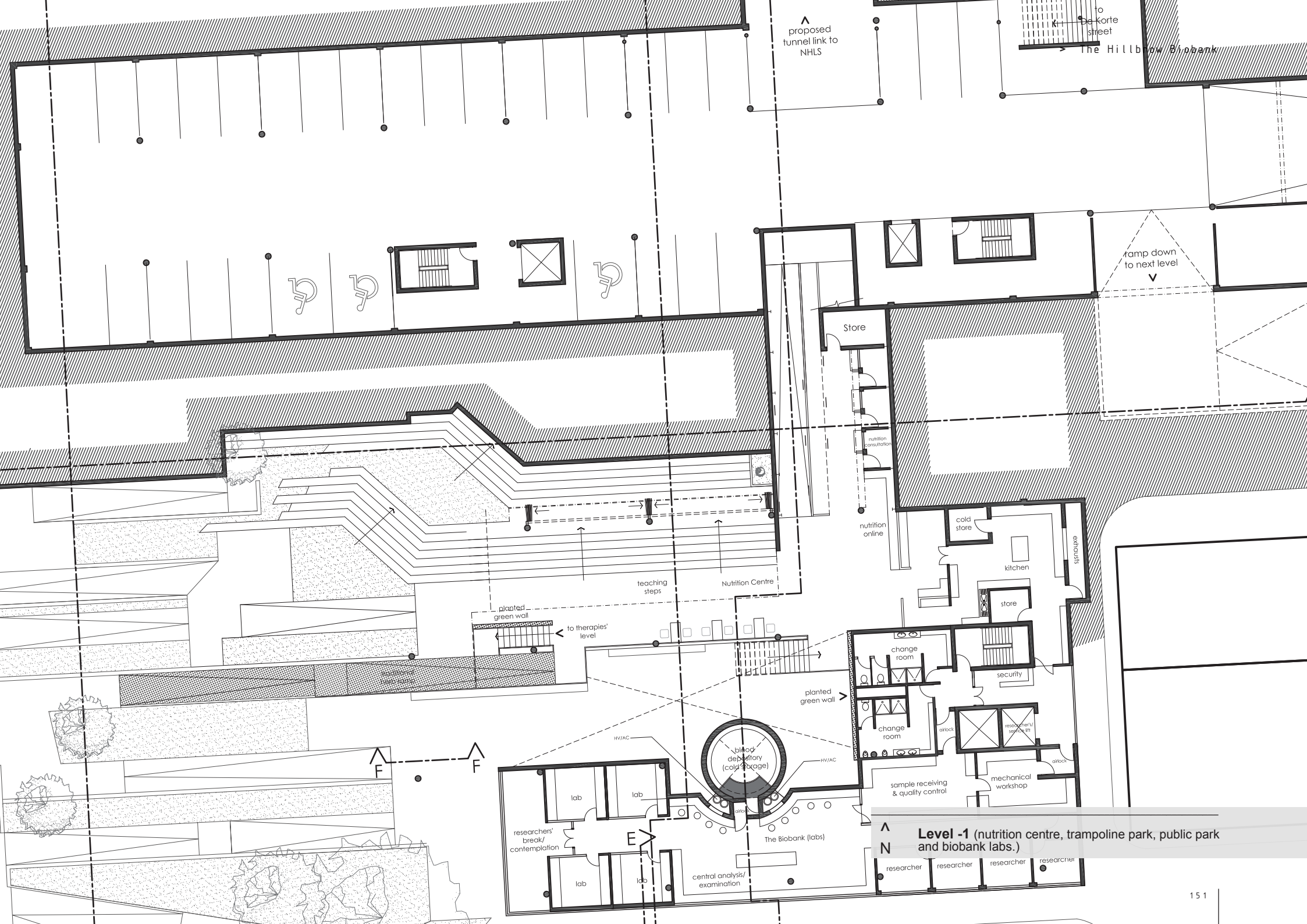
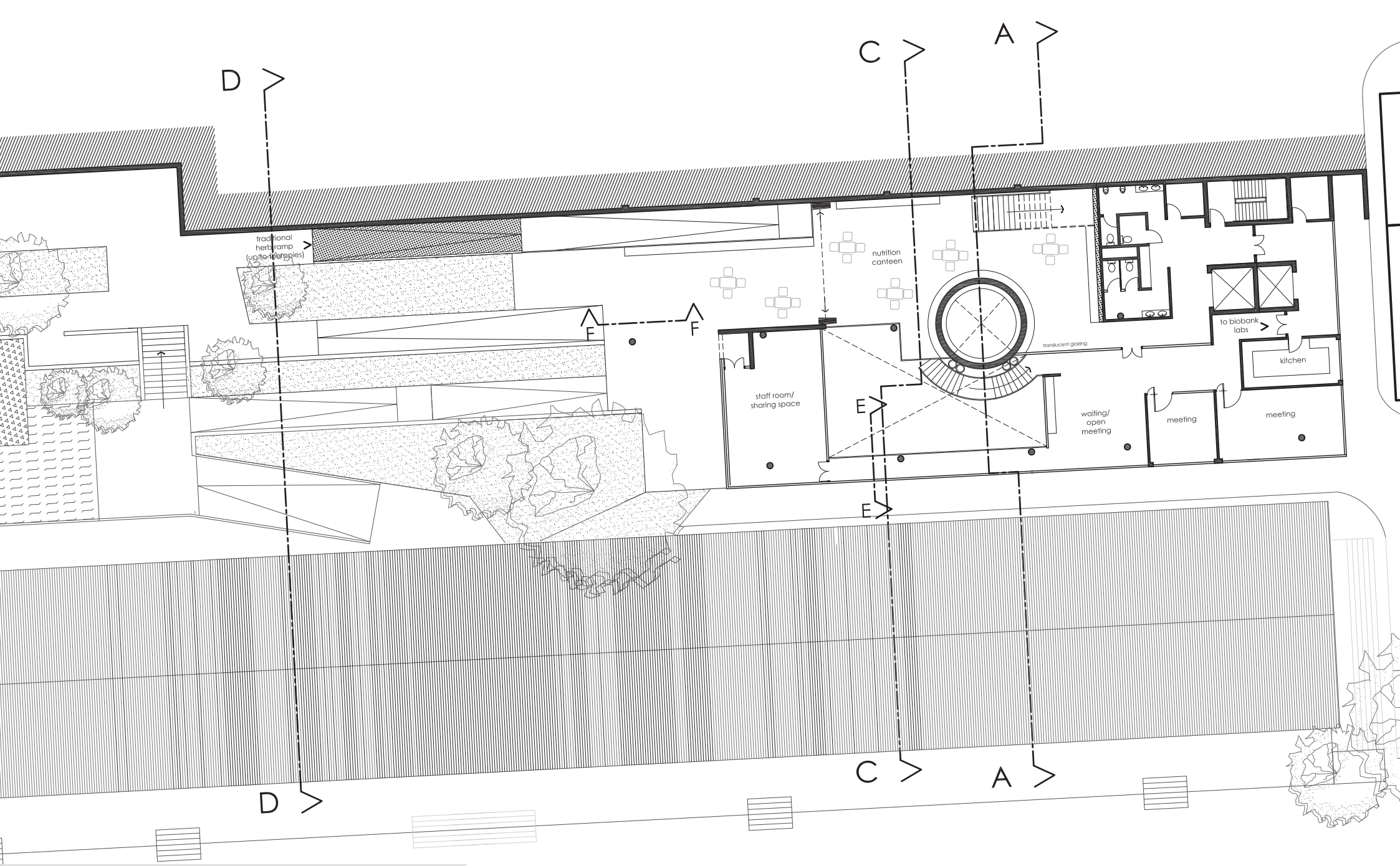
Level 2 (library, youth training, admin.)



Level 0.5 (therapies and personal archive)

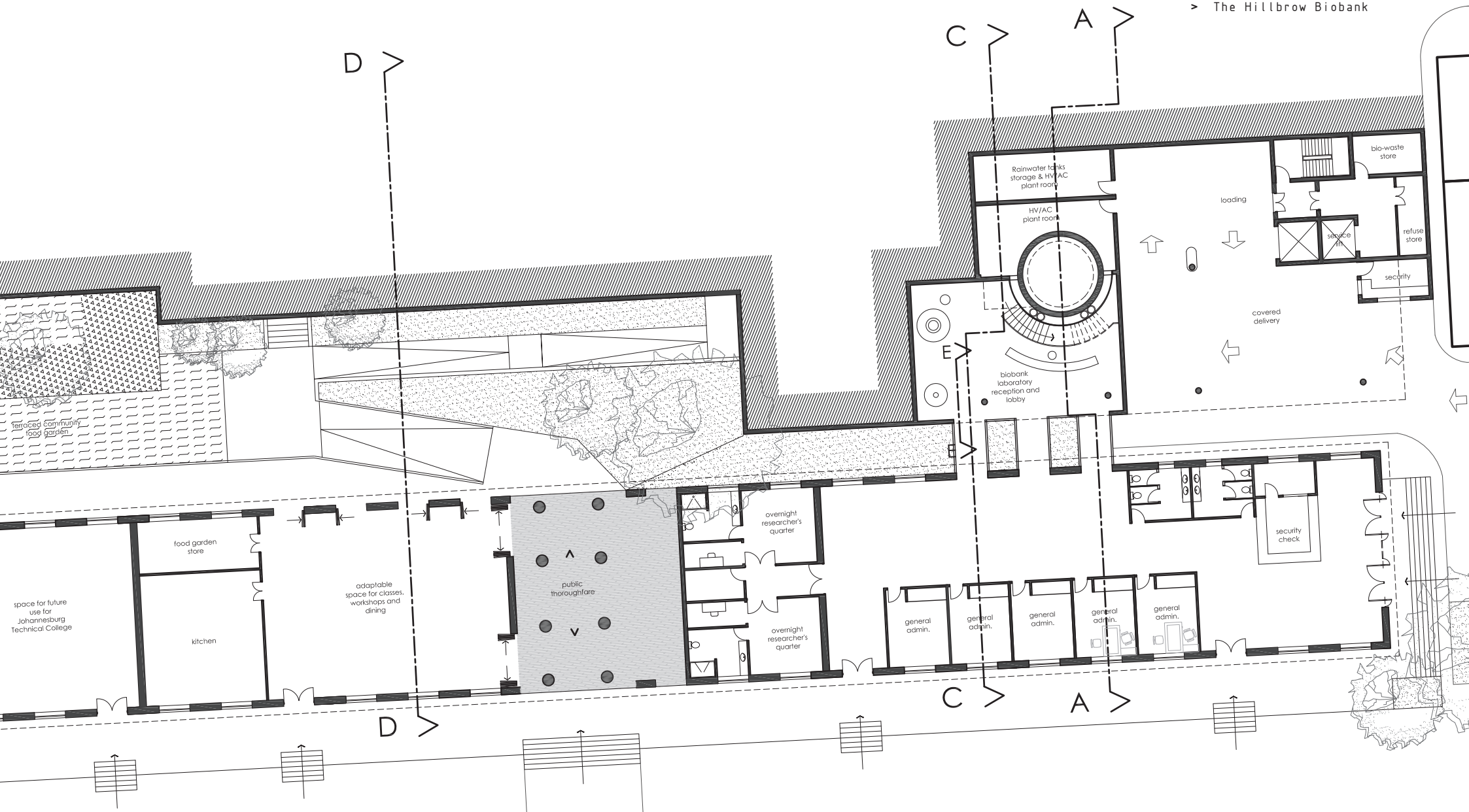


Level -1 (nutrition centre, trampoline park, public park and biobank labs.)



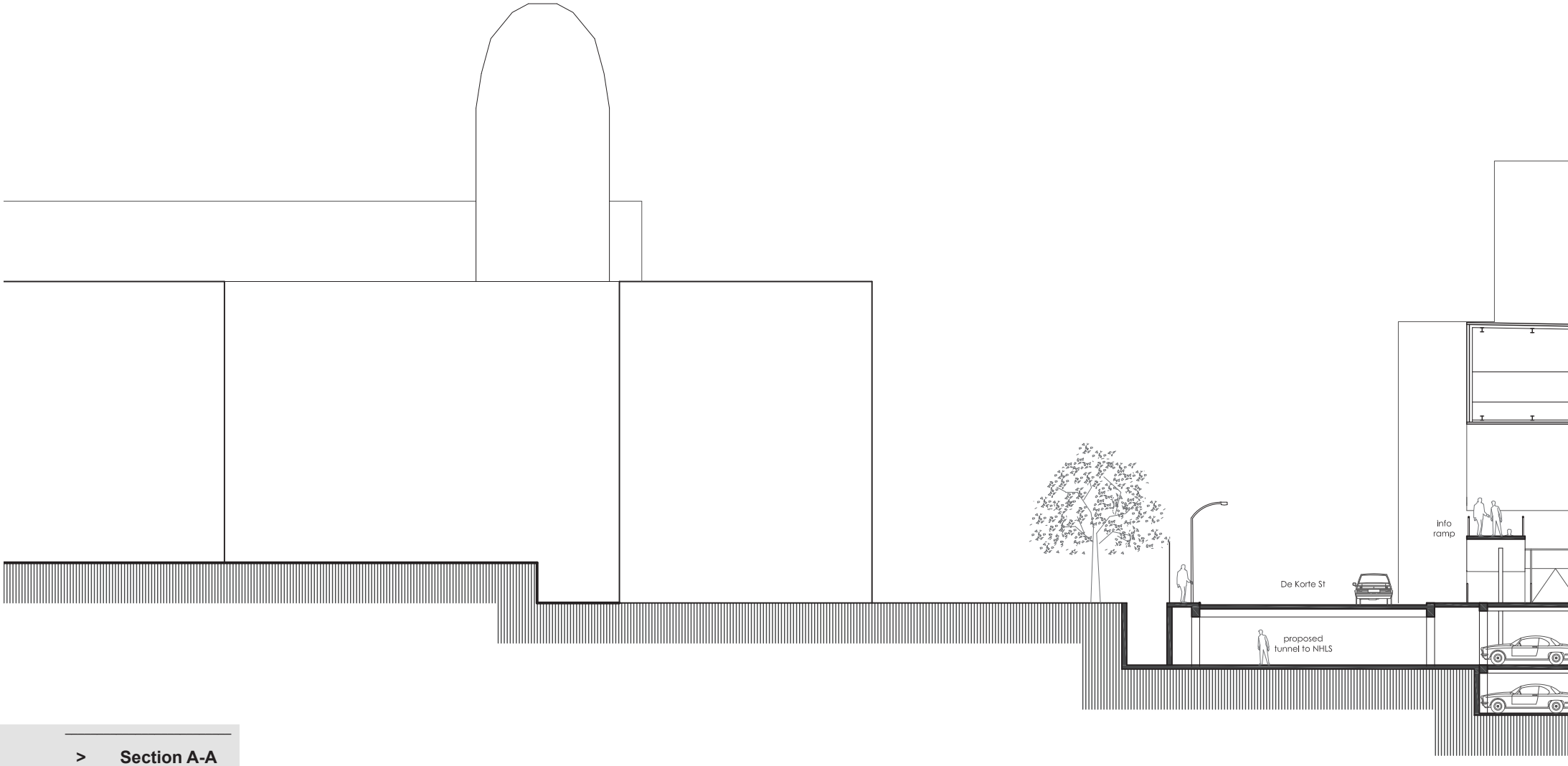
N

Level -2 (nutrition canteen, researcher's meeting rooms and staff room)

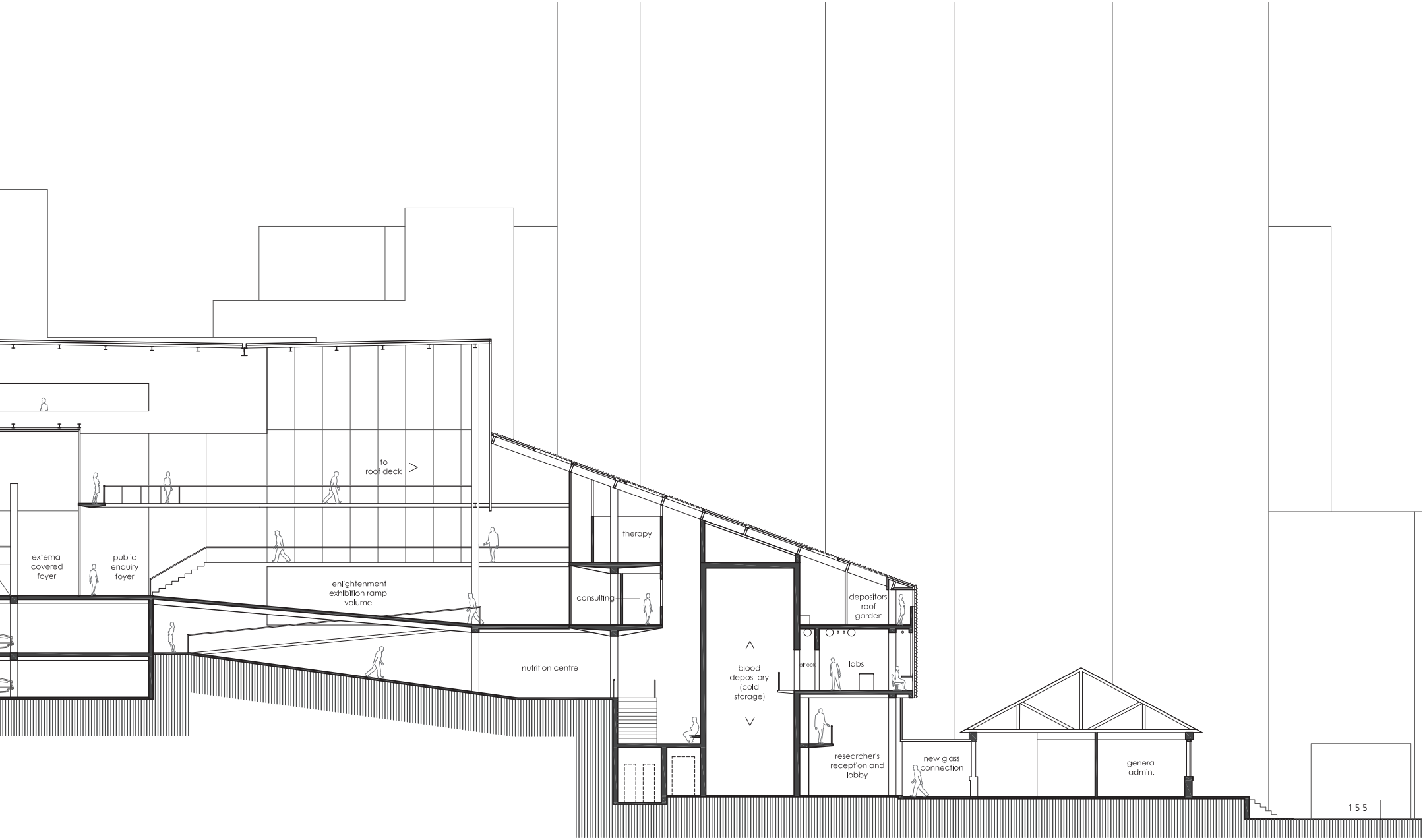


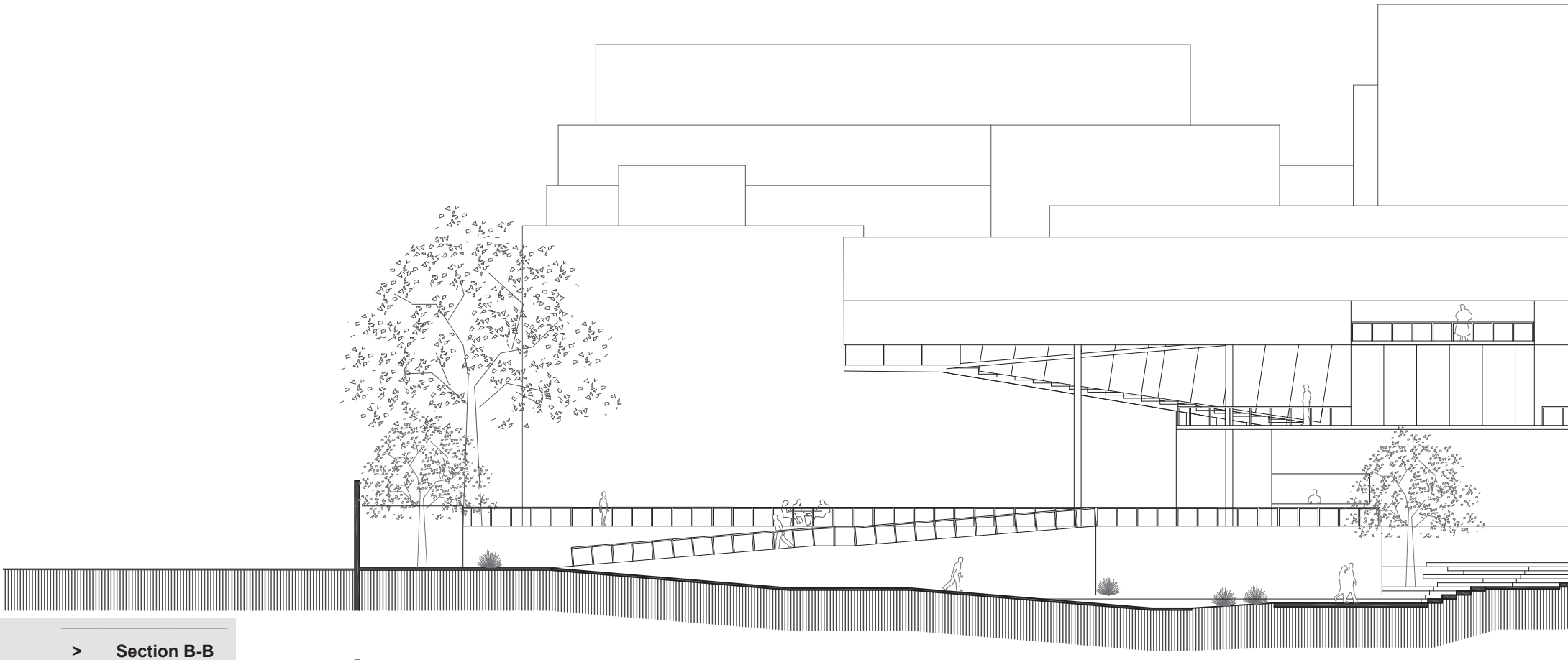
N

Level -3 (researchers' entry: security check, general admin, overnight quarters, biobank reception, service access.)

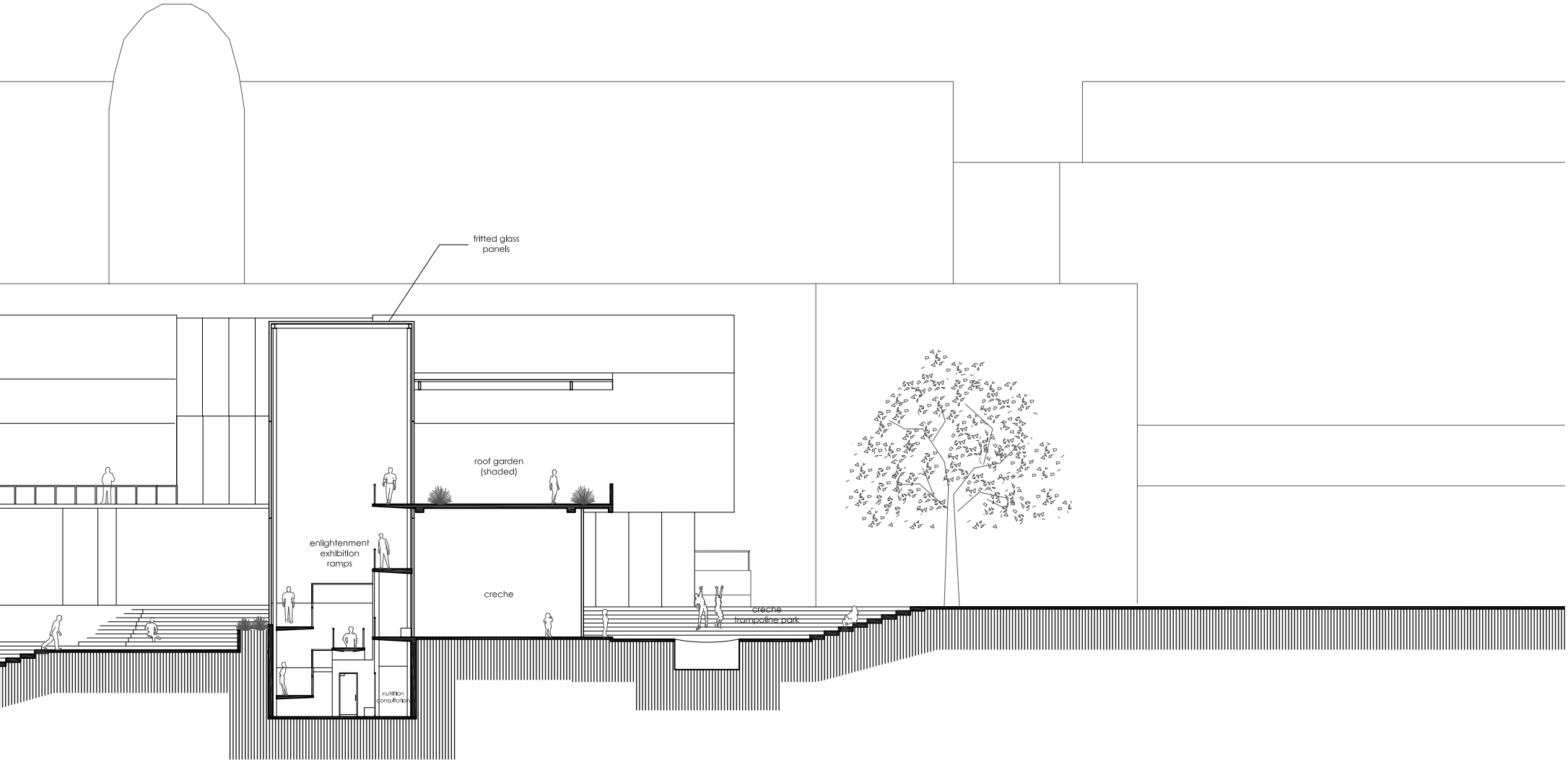


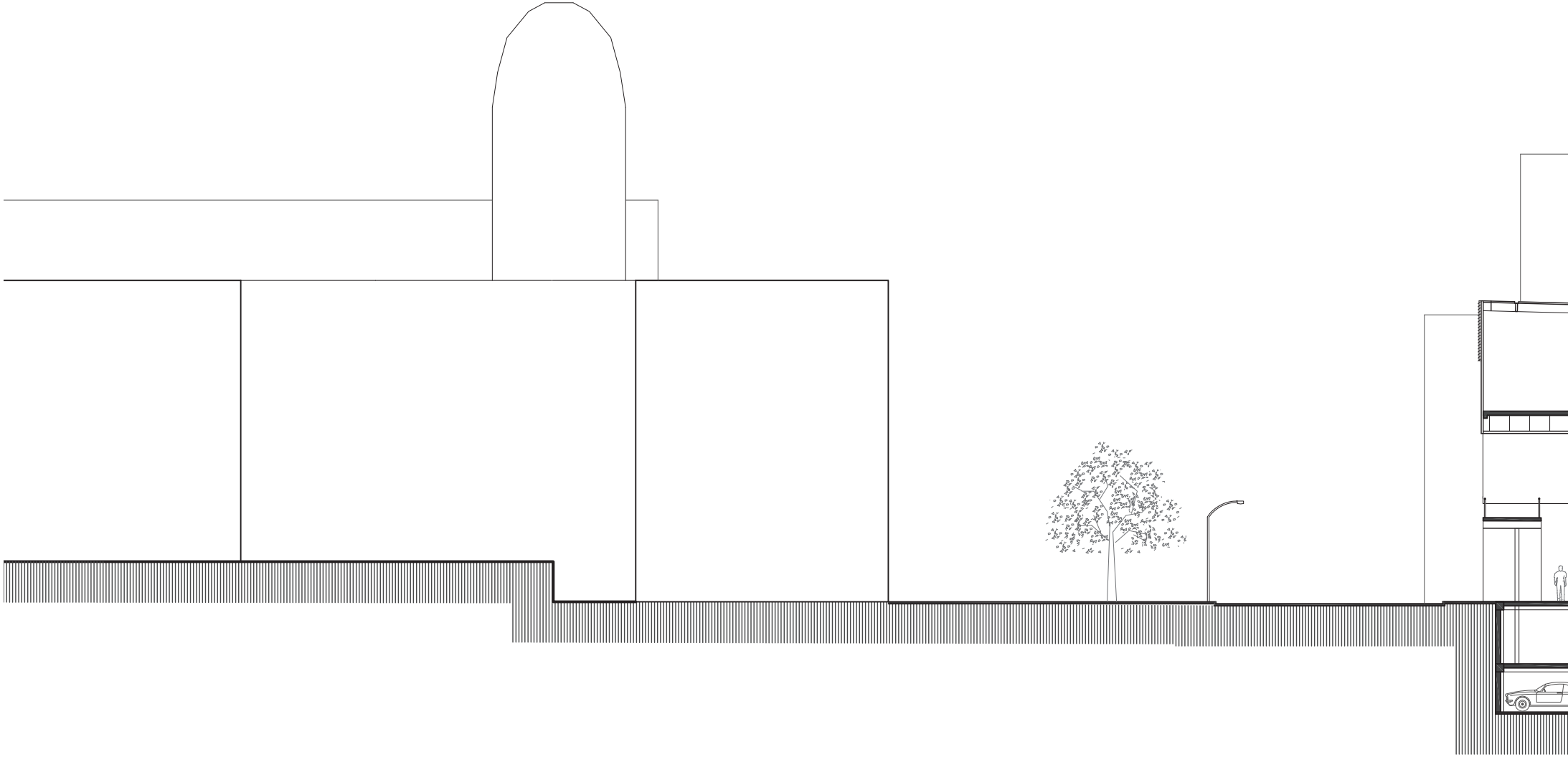
> **Section A-A**


to
roof deck
external
covered
foyer
public
enquiry
foyer
enlightenment
exhibition ramp
volume
therapy
consulting
nutrition centre
blood
depository
(cold
storage)
labs
depositors'
roof
garden
researcher's
reception and
lobby
new glass
connection
general
admin.

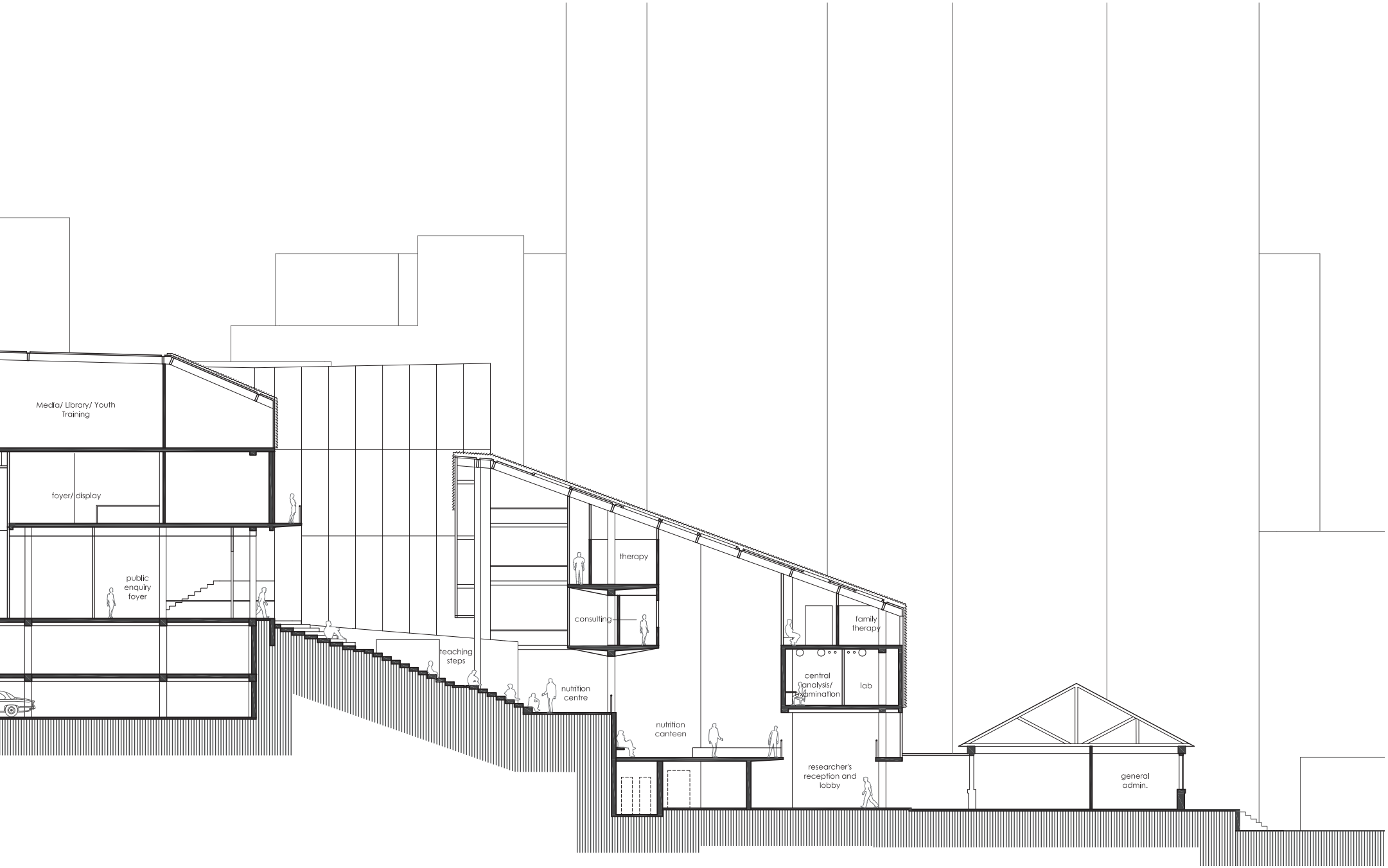


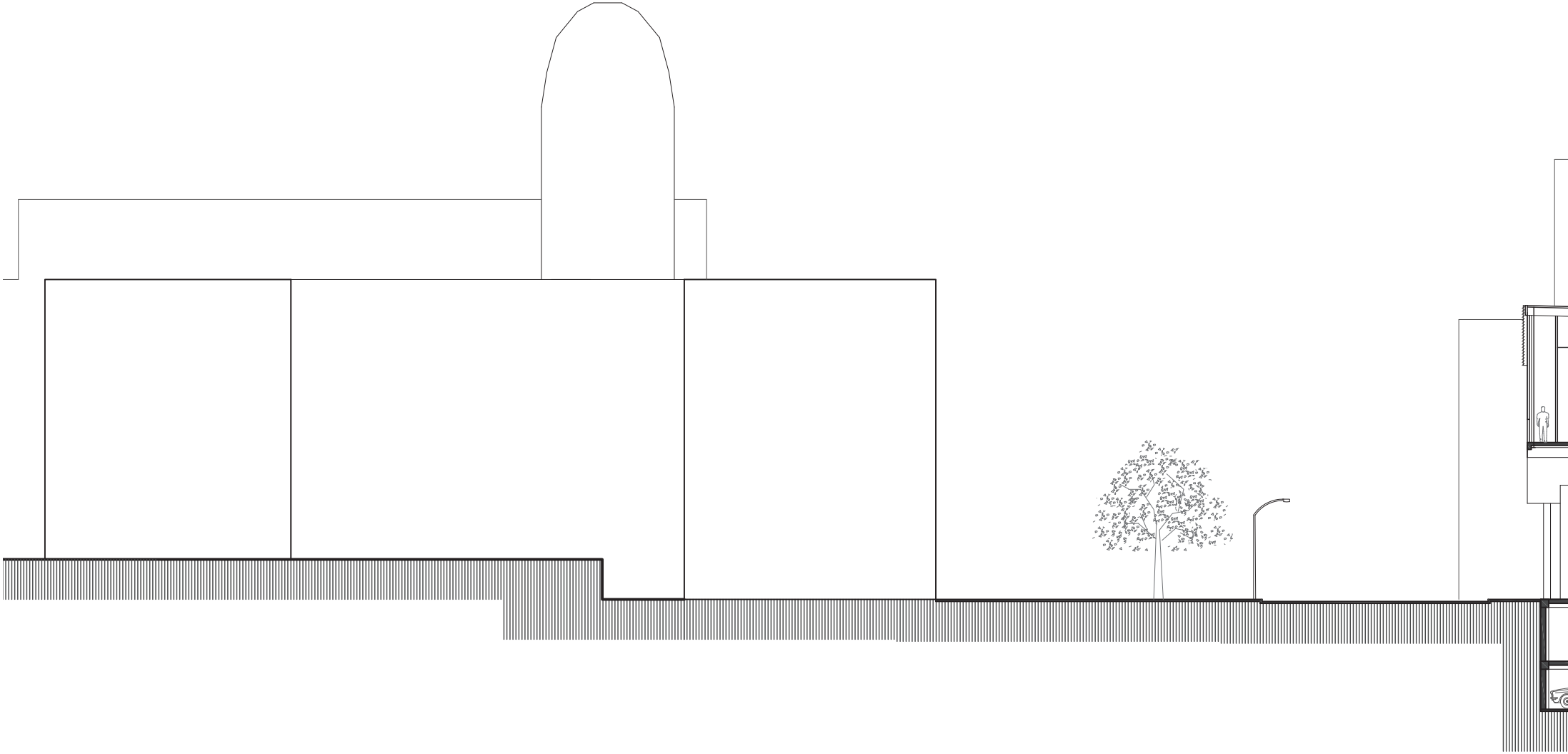
> Section B-B


fritted glass
panels
roof garden
(shaded)
enlightenment
exhibition
ramps
creche
creche
trampoline park
nutrition
consultation



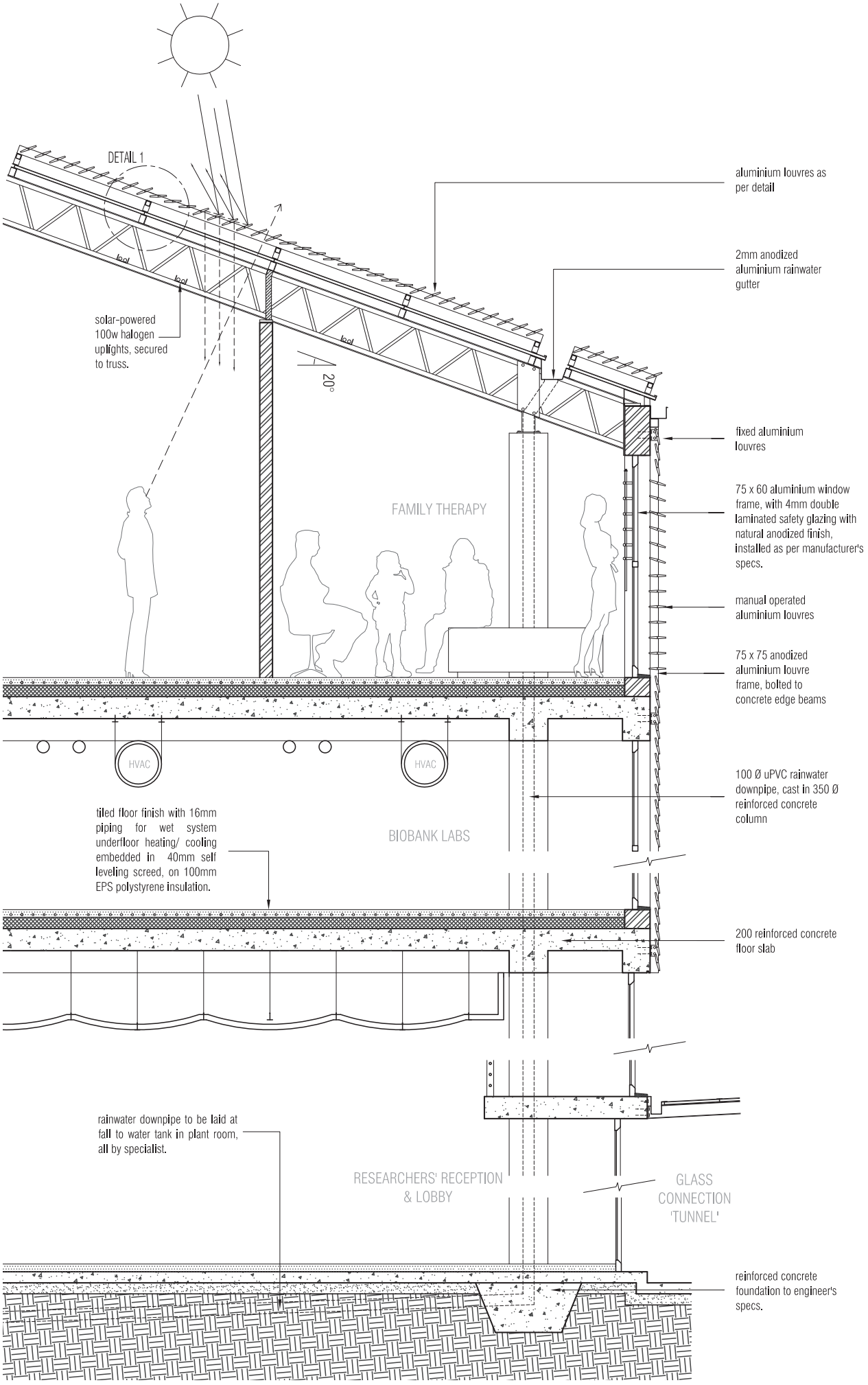
> **Section C-C**

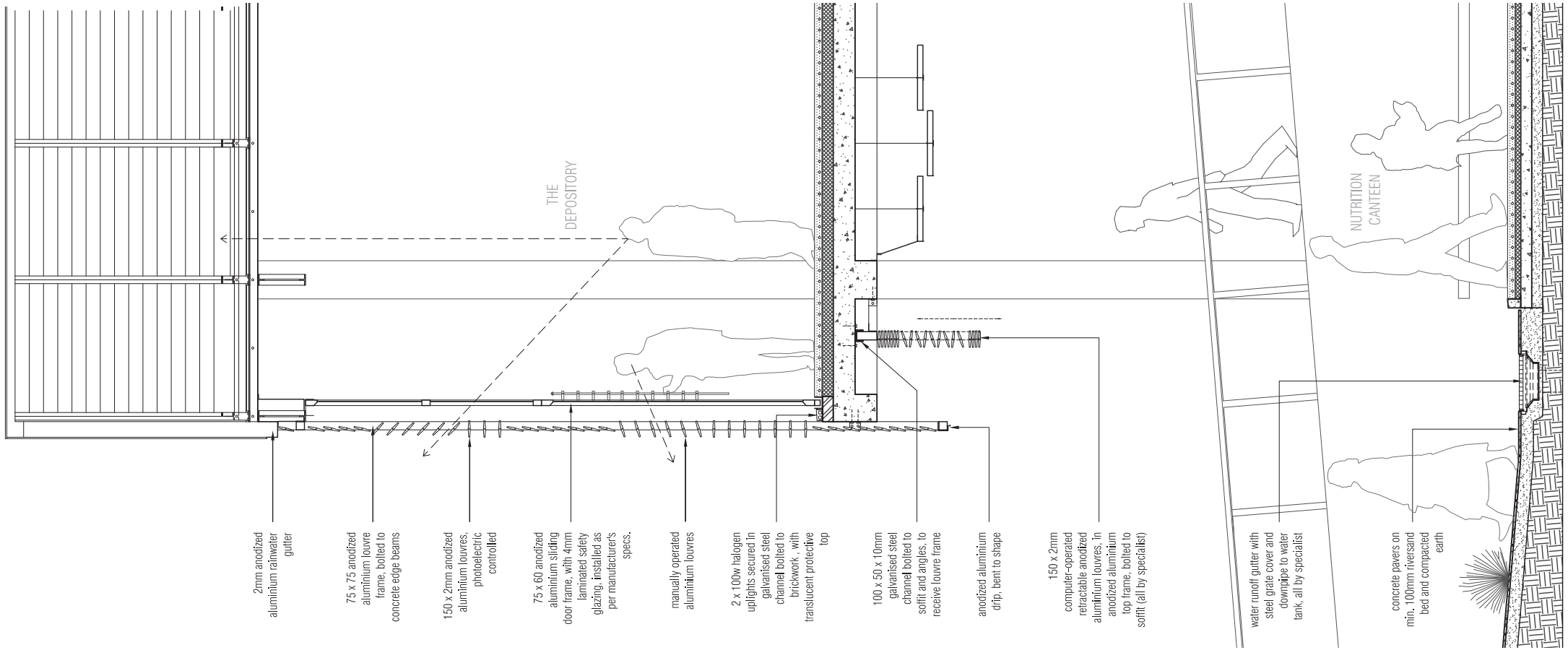

Media/ Library/ Youth Training
foyer/ display
public enquiry foyer
therapy
consulting
family therapy
teaching steps
central analysis/ examination
lab
nutrition centre
nutrition canteen
researcher's reception and lobby
general admin.



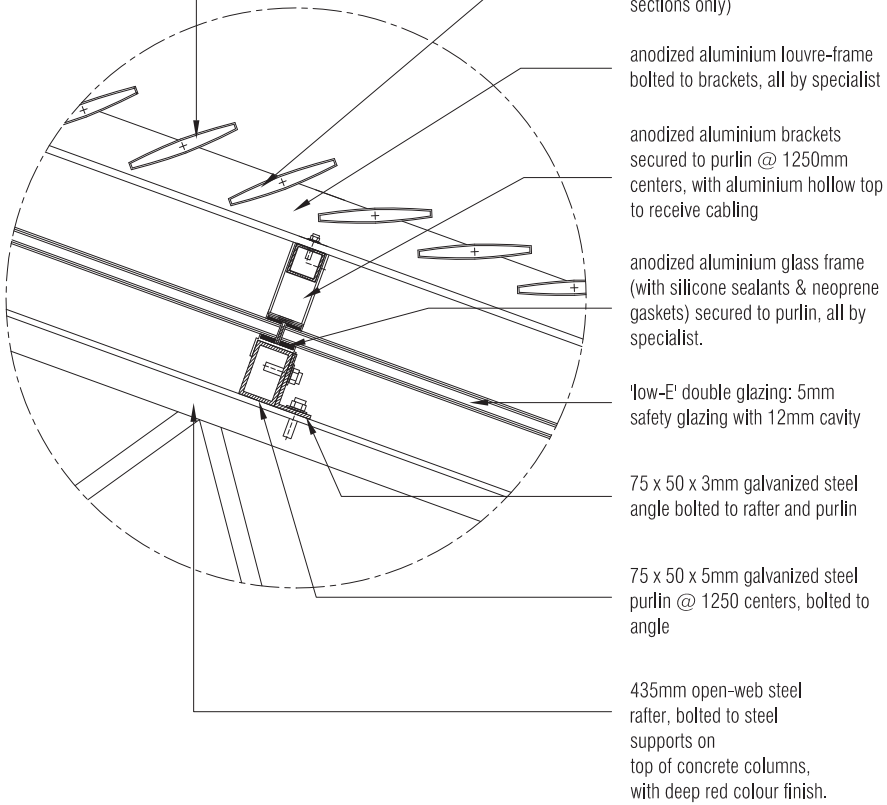
> **Section D-D**


multi-purpose
auditorium
adaptable
space for classes,
workshops and
dining


DETAIL 1
aluminium louvres as per detail
2mm anodized aluminium rainwater gutter
solar-powered 100w halogen uplights, secured to truss.
20°
fixed aluminium louvres
75 x 60 aluminium window frame, with 4mm double laminated safety glazing with natural anodized finish, installed as per manufacturer's specs.
FAMILY THERAPY
manual operated aluminium louvres
75 x 75 anodized aluminium louvre frame, bolted to concrete edge beams
HVAC
HVAC
100 Ø uPVC rainwater downpipe, cast in 350 Ø reinforced concrete column
tiled floor finish with 16mm piping for wet system underfloor heating/ cooling embedded in 40mm self leveling screed, on 100mm EPS polystyrene insulation.
BIOBANK LABS
200 reinforced concrete floor slab
rainwater downpipe to be laid at fall to water tank in plant room, all by specialist.
RESEARCHERS' RECEPTION & LOBBY
GLASS CONNECTION 'TUNNEL'
reinforced concrete foundation to engineer's specs.

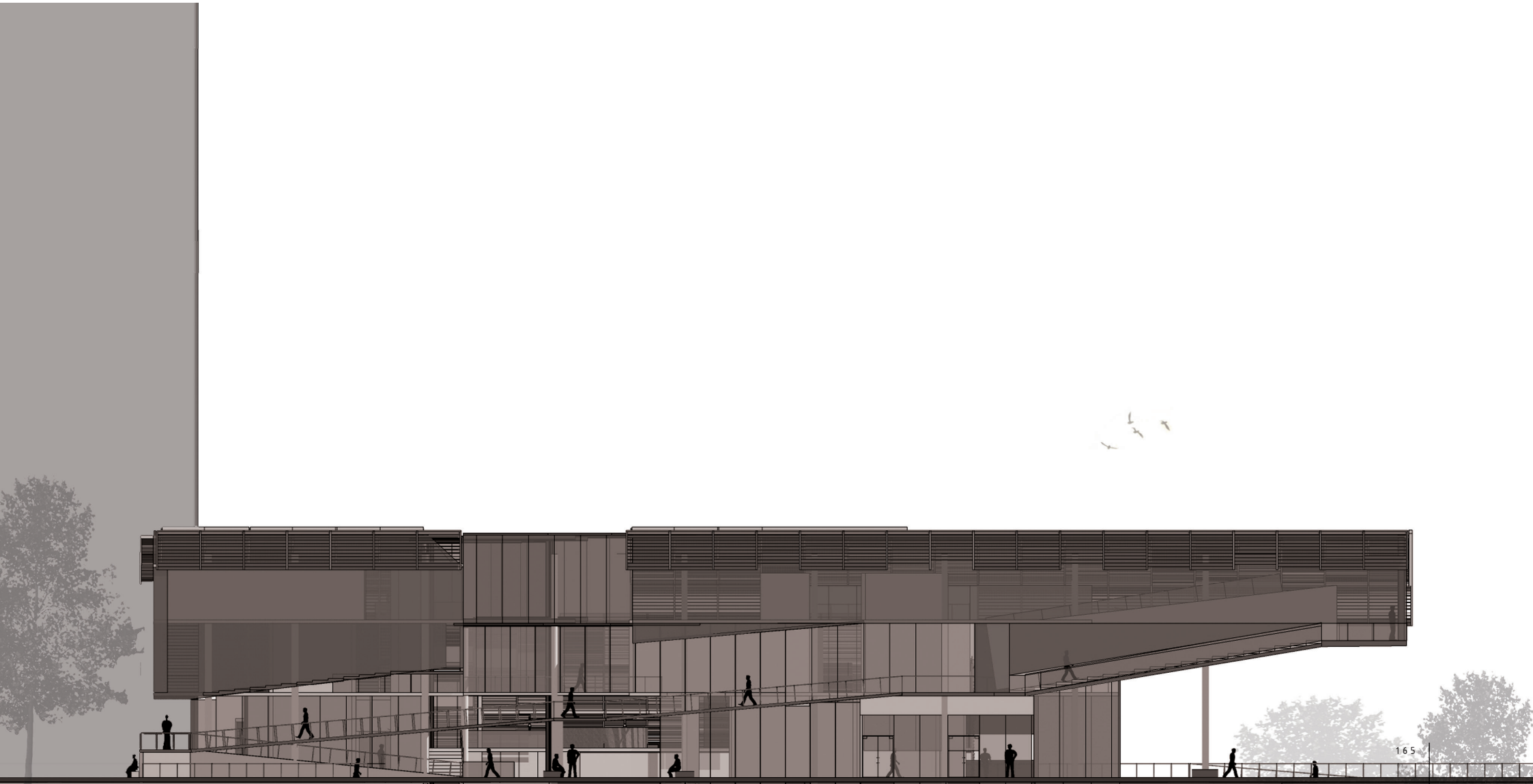

THE
DEPOSITORY
NUTRITION
CANTEEN
2mm anodized aluminium rainwater gutter
75 x 75 anodized aluminium louvre frame, bolted to concrete edge beams
150 x 2mm anodized aluminium louvres, photoelectric controlled
75 x 60 anodized aluminium sliding door frame, with 4mm laminated safety glazing, installed as per manufacturer's specs.
manually operated aluminium louvres
2 x 100w halogen uplights secured in galvanised steel channel bolted to brickwork, with translucent protective top
100 x 50 x 10mm galvanised steel channel bolted to soffit and angles, to receive louvre frame
anodized aluminium drip, bent to shape
150 x 2mm computer-operated retractable anodized aluminium louvres, in anodized aluminium top frame, bolted to soffit (all by specialist)
water runoff gutter with steel grate cover and downpipe to water tank, all by specialist
concrete pavers on min. 100mm riversand bed and compacted earth

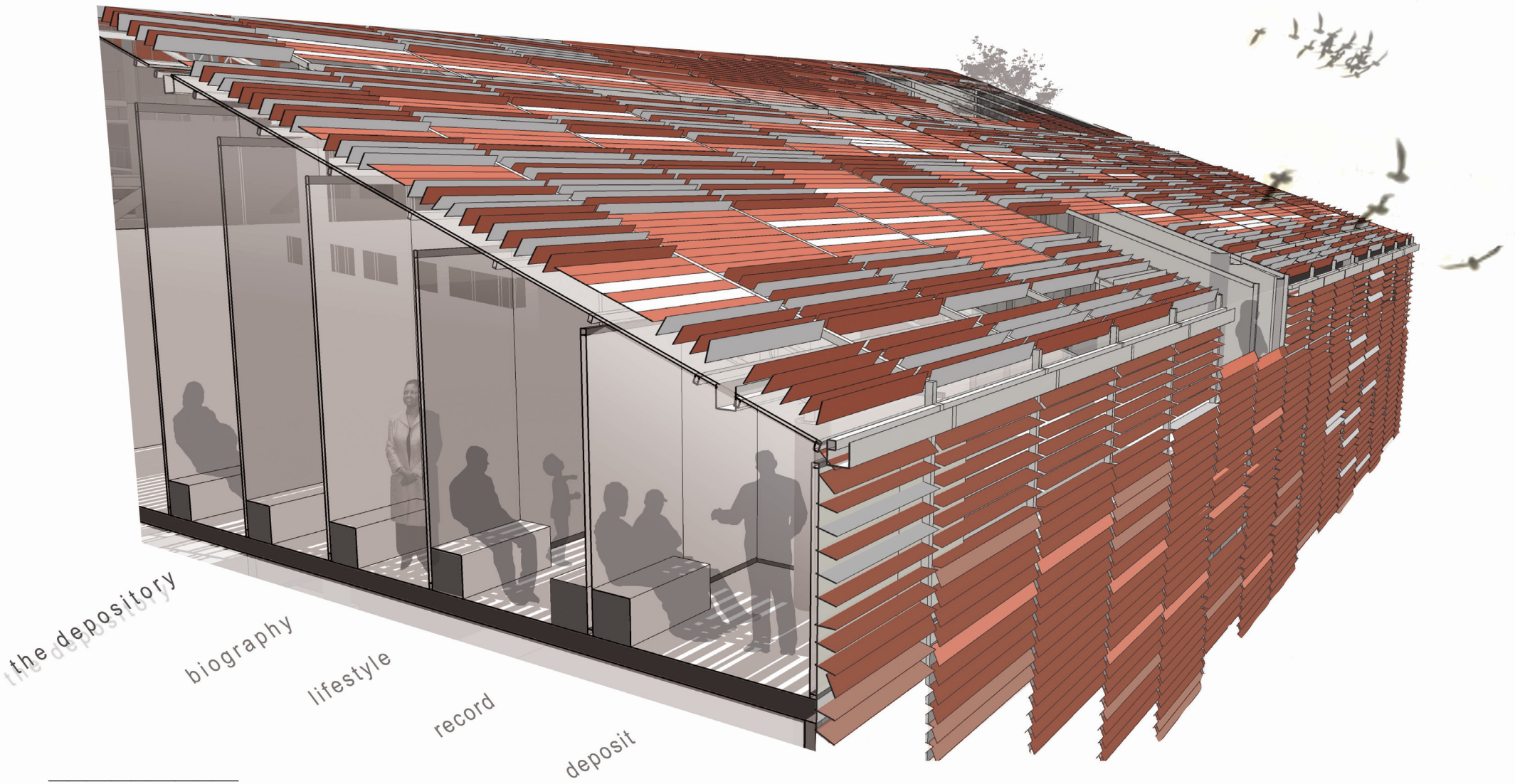
> Section F-F


150 x 2mm anodized aluminium louvres, photoelectric controlled
fixed laminated safety glass photovoltaic louvres (northern roof sections only)
anodized aluminium louvre-frame bolted to brackets, all by specialist
anodized aluminium brackets secured to purlin @ 1250mm centers, with aluminium hollow top to receive cabling
anodized aluminium glass frame (with silicone sealants & neoprene gaskets) secured to purlin, all by specialist.
'low-E' double glazing: 5mm safety glazing with 12mm cavity
75 x 50 x 3mm galvanized steel angle bolted to rafter and purlin
75 x 50 x 5mm galvanized steel purlin @ 1250 centers, bolted to angle
435mm open-web steel rafter, bolted to steel supports on top of concrete columns, with deep red colour finish.

> Detail 1

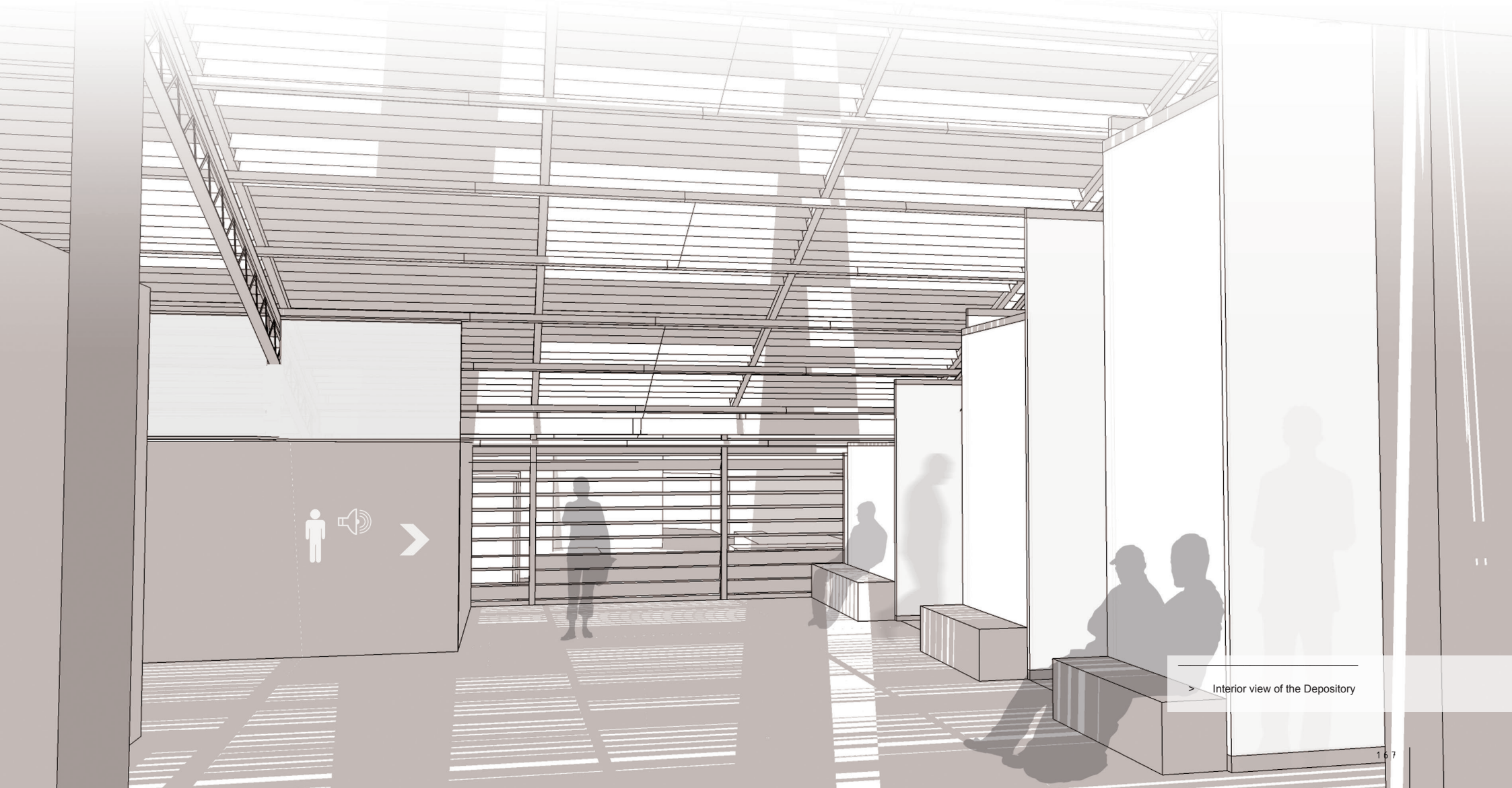
> North Elevation





> **The Depository**

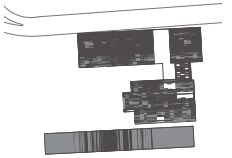
Under a continuously changing roof skin, light animates the space where personal stories and lifestyles are shared, discussed and recorded for research purposes. This may eventually end in a voluntary blood deposit.

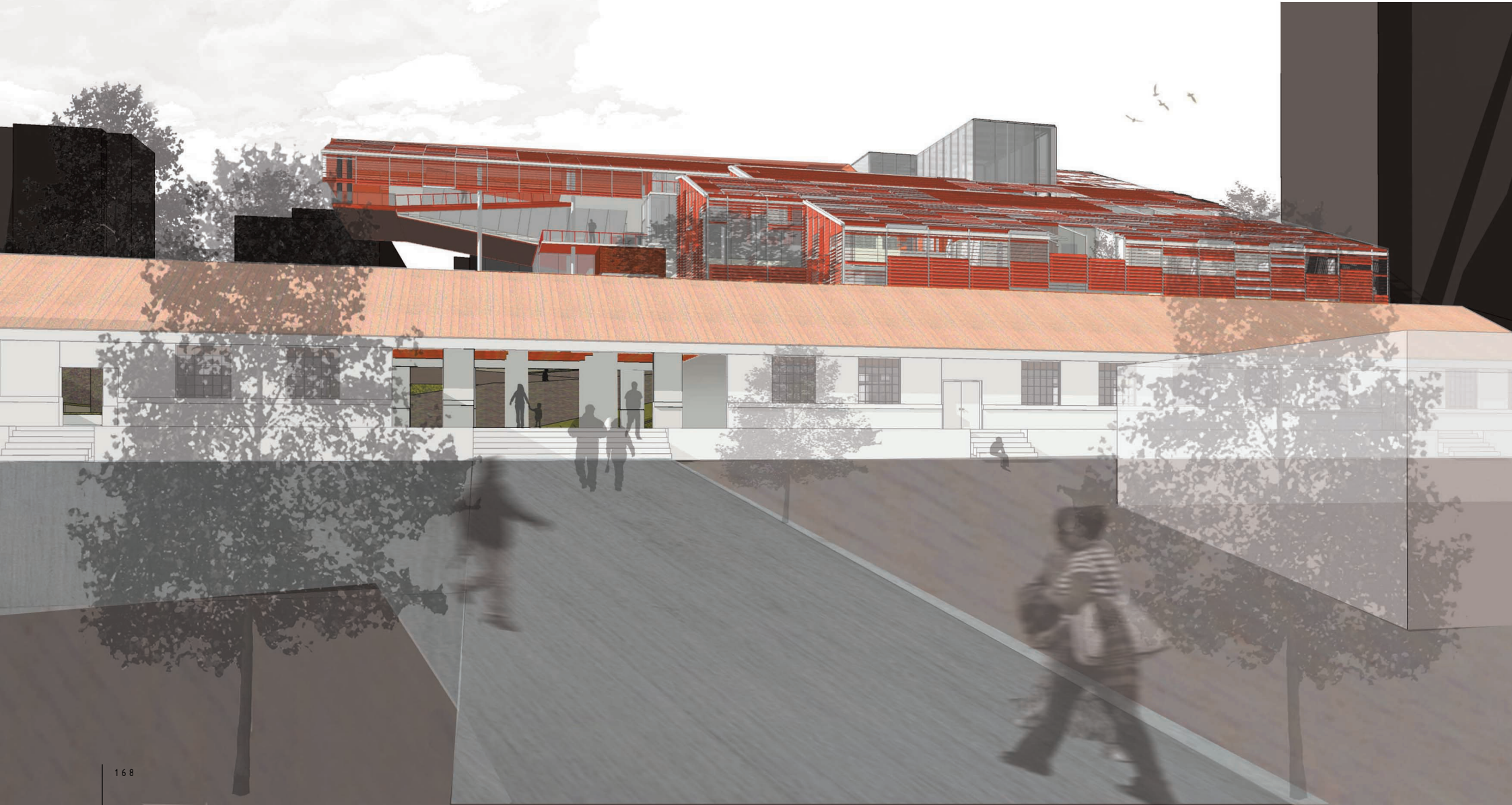


> Interior view of the Depository

> **View from Smit St**

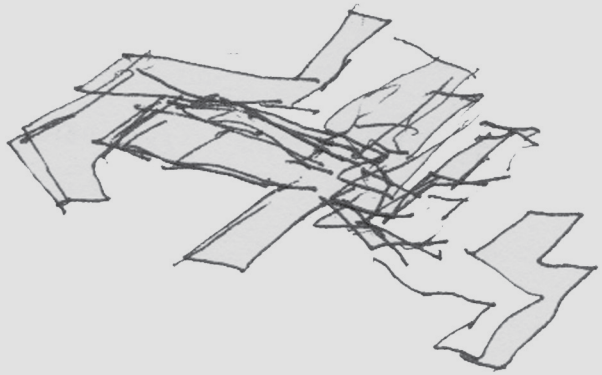
Pedestrians on route from Park Station would first experience the building's roof that is animated with moving louvres throughout the day.

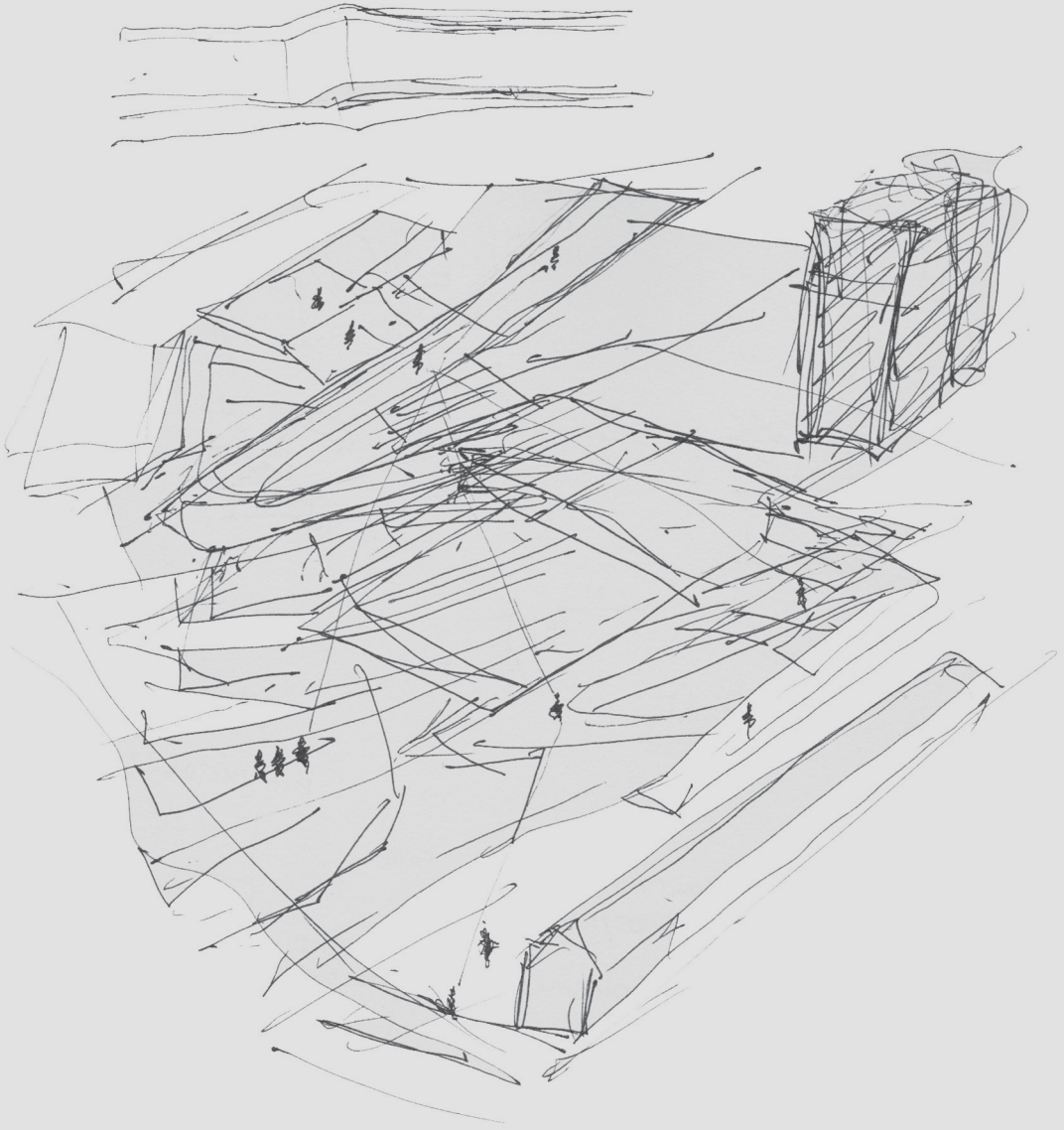




> Aerial **View**

The public park is an extension of the building: breaking through on the western edges which are lined by the nutrition centre and canteen. Teaching steps are used for outdoor discussions and workshops, which passers-by can attend.





References

Books

Allen, L (ed) et al. 2009. *Bartlett Designs: speculating with architecture.* Chichester: Wiley & Sons Ltd.

Allen, L. & Manolopoulou, Y. 2009. Landscape in *Bartlett Designs: speculating with architecture.* Chichester: Wiley & Sons Ltd.

Burdett, R. & Sudjic, D. (ed.) 2007. *The Endless City.* New York: Phaidon Press.

Chipkin, C. M. 1993. *Johannesburg Style.* Cape Town: David Philip.

Clear, N. & Borden, I. 2009. Urbanisms in *Bartlett Designs: speculating with architecture.* Chichester: Wiley & Sons Ltd.

Crofton, I (ed). 1995. *The Guinness Encyclopaedia.* Middlesex: Guinness Publishing.

Cruz, M. & Gage, S. 2009. Interaction in *Bartlett Designs: speculating with architecture.* Chichester: Wiley & Sons Ltd.

Ellin, N. 2006. *Integral Urbanism.* New York: Routledge.

Ferre, A. 2004. "Seattle Public Library". *Verb, Connection:* 1-31.

Gidish, L. 2011. "The Silent Killer". *Discovery Magazine* [sa] (41): 34-36.

Goffman, E. 1963. *Stigma: Notes on the Management of a Spoiled Identity.* Harmondsworth: Penguin Books.

Hwang, I (ed). 2009. *Verb, Nature:* 2-20.

Incerti, G.et al. 2006. *Diller + Scofidio (+ Renfro): The Ciliary Function.* Milan: Skira.

Jan Henket, H and Heynen,H. 2002. *Back from Utopia: the challenge of the modern movement.* New York: 010 Publishers.

Kac, E (ed). 2007. *Signs of Life: Bio Art and Beyond.* London: The MIT Press.

Kilduffe and DeBakery. 1943. *The Blood Bank and the Technique and Therapeutics of Transfusions.* London: Henry Kimpton.

Leslie. 2005. *Louis I. Khan: Building Art, Building Science.* New York: George Braziller Inc.

McCandless, D. 2009. *Information is Beautiful.* London: Collins.

The Metapolis Dictionary of Advanced Architecture: City, Technology and Society in the Information Age. 2003. Sv "transgenetic transfusions". Barcelona: Actar.

Meyer, M.L. 2005. *Thicker Than Water: the Origins of Blood as Symbol and Ritual.* New York: Routledge.

Morris, A. (1999). *Bleakness and Light: Inner-City Transition in Hillbrow, Johannesburg.* Witwatersrand University Press: Johannesburg.

Mills, S. 2003. *Routledge Critical Thinkers: Michel Foucault*. New York: Routledge.

Noe, A. 2004. *Action in Perception.* Massachusetts: The MIT Press.

Pallasmaa, J. 1996. *The Eyes of the Skin: Architecture and the Senses.* London: Academy Group Ltd.

Park, A. 2009. "10 Ideas Changing the World Right Now: #8 Biobanks". *Time Magazine* 173(12):36.

Purves, G. 2002. *Healthy Living Centres*. Oxford: Architectural Press.

Peres, E. 2009. "National Tuberculosis Reference Laboratory". *Digest of South African Architecture* 14: 22-23.

Rudolph, H. (1986). *Johannesburg- One hundred Years*. Chris van Rensburg Publications: Johannesburg.
Sample, H. 2008. "BioMed City". *Verb, Crisis:* 68-77.

Sennett, R. 1994. *Flesh and Stone.* London: Faber and Faber.

Van Berkel, B. And Bos, C. (2006). *UN Studio, Design Models, Architecture, Urbanism, Infrastructure.* New York: Rizzoli.

WHO. 1993. *Guidelines for Quality Assurance Programmes for Blood Transfuion Services.* Geneva: World Health Organization Publishing.

Reports/ Articles

GAPP Architects and Urban Planners. 2004. *Hillbrow Health Precinct: business plan.* Johannesburg: GAPP-IOSDA Consortium.

Le Marcis, F. 2004. *The Suffering Body of the City*. [O].
Available: http://muse.jhu.edu/login?uri=/journals/public_culture/v016/16.3marcis.html
Accessed on 2011/03/23

Ludwig Hansen Architects and Urban Designers. 2011. *Hillbrow Health Precinct: Methodology towards development guideline, Architectural and Precinct Implementation.* Johannesburg: Ludwig Hansen Architects and Urban Designers.

Sgaier, S.K. 2007. *Biobanks in Developing Countries: needs and feasibility.* [O].
Available: http://www.sciencemag.com
Accessed on 2011/04/20

Walsh, F. 2010. *Biobank: tracking the health of a generation.* [O].
Available: http://www.bbc.co.uk/blogs/thereports/ferguswalsh/2010/07biobank_tracking_the_health_of_a_generation.html
Accessed on 2011/03/08

WHO. 2005. *Manual on the Management, Maintenance and Use of Blood Cold Chain Equipment.* [O].

Available: http://www.who.org
Accessed on 2011/8/15

Interviews

Dr Faal,M. Doctor, RHRU Hillbrow Health Precinct. 2011. Interview by author. [Transcript]. 6th June. Hillbrow.

Gail. Manager, SANBS Northgate Blood Centre. 2011. Interview by author. [Transcript]. 29th April. Northgate Mall.

Glencross, D. Associate Professor Department of Molecular Medicine and Haematology at the Faculty of Health Sciences, University of the Witwatersrand and the National Health Laboratory Service. 2011. Interview by author. [Transcript]. 3rd June. Parktown.

Horowitz, Y. Programme Manager, Hillbrow Health Precinct. 2011. Interview by author. [Transcript]. 14th April. Hillbrow.

Jenny. Donor assistant, SANBS Auckland Park Blood Centre. 2011. Interview by author. [Transcript]. 29th March. Auckland Park.

Kubi, enrolled nurse, SANBS Northgate Blood Centre. 2011. Interview by author. [Transcript]. 29th April. Northgate Mall.

Minani, P. Information Officer, Hillbrow Health Precinct. 2011. Interview by author. [Transcript]. 14th April. Hillbrow.

Monique. Donor, Auckland Park Blood Centre. 2011. Interview by author. [Transcript]. 29th March. Auckland Park.

Sister Onika. Head Nurse, Esselin Clinic. 2011. Interview by author. [Transcript]. 21st June. Hillbrow.

Websites

<http://www.sanbs.org.za>
Accessed on 2011/02/25

<http://www.arcspace.com>
Accessed on 2011/04/25

<http://www.matharooandassociates.com>
Accessed on 2011/02/28

<http://www.who.org>
Accessed on 2011/04/10

<http://en.wikipedia.org>
Accessed on 2011/03/05

<http://www.joburg.org.za>
Accessed on 2011/04/15

<http://www.rhru.co.za>
Accessed on 2011/03/02

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